

ESTABLISHED 1883

OVER
50
YEARS of
SERVICE to
the FARM



STARLINE INC.

formerly HUNT, HELM, FERRIS & CO. INC.
Harvard, Illinois

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Alan O'Bright

STARLINE PRICE BOOK

Effective August 20, 1937

SUPERSEDES ALL PREVIOUS LISTS

SUBJECT TO CHANGE
WITHOUT NOTICE

These Prices Apply to
Catalog No. 100



All Shipments F. O. B. Harvard, Ill.

Except as noted

STARLINE INC.

Formerly Hunt-Helm-Ferris & Co., Inc.

MAIN OFFICE AND FACTORY
HARVARD, ILLINOIS

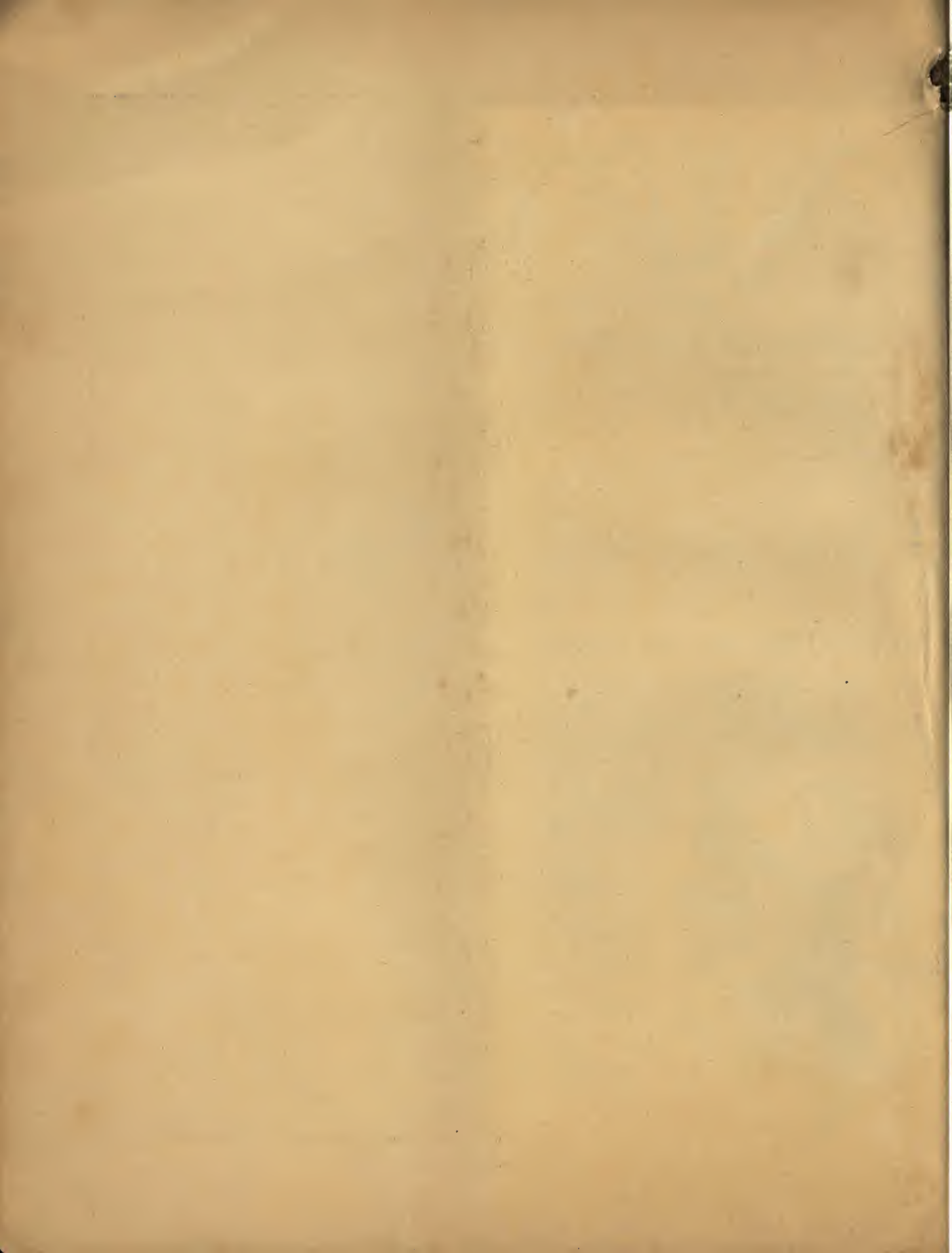
Eastern Branch

1031 Broadway

Albany, N. Y.

5-903
39.50

1159
570
1729





★ STARLINE INC., Harvard, Ill. ★

Guarantee of Quality

We Know Our Goods to be the Best That Money, Brains
and "Know How" Can Put Together, Hence
This Iron-Clad, Binding Guarantee

We Absolutely and Positively Guarantee all goods manufactured by us to
give satisfaction to the user in every respect. This guarantee applies
not only to workmanship and material but to construction and
operation as well.

Should any article manufactured by us prove defective, notify us
and we will replace same without one penny's cost to you.

STARLINE INC.

By

A. D. Beel

Pres.

The STAR Guarantee

and the Factory Behind It

STARLINE INC.

FORMERLY HUNT-HELM-FERRIS & CO., Inc.

ESTABLISHED 1883

HARVARD, ILL.

1031 BROADWAY, ALBANY N. Y.

FOR OVER



"There was nothing elaborate about the building we occupied in 1884"

FOR over fifty years Starline, Inc. has been solving problems for farmers. These problems are those which have to do with farm buildings and their equipment. It has specialized in this field.

These problems have not been solved either by our personal experience or by any theoretical ideas on our own part. They have been solved by applying to them the

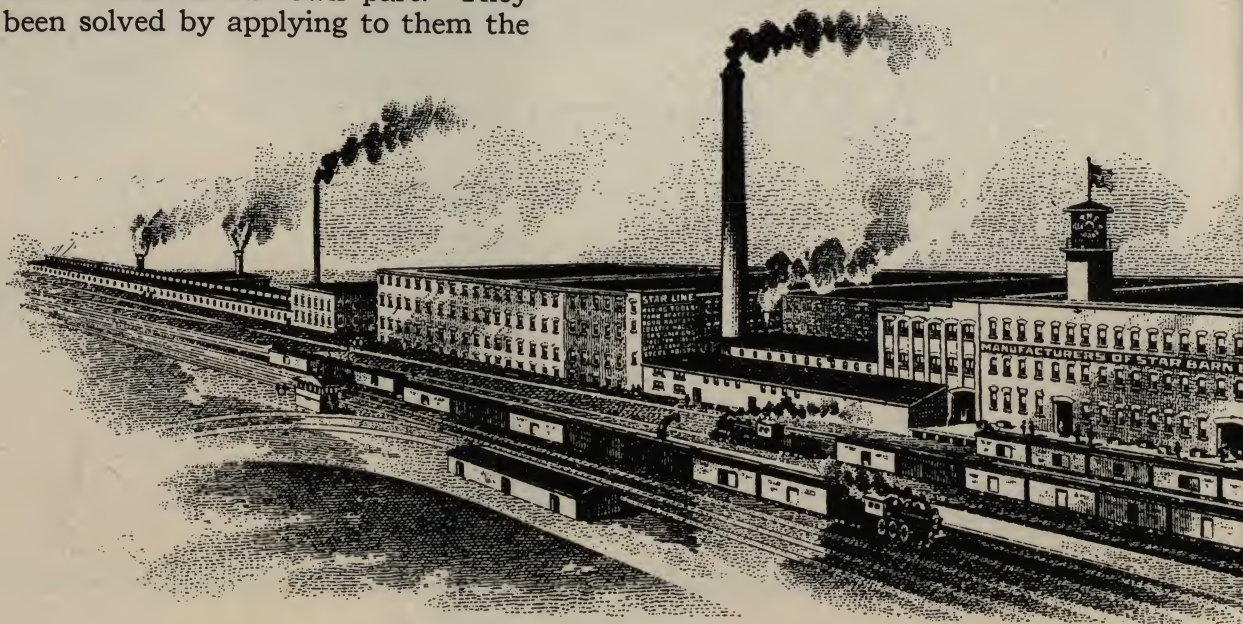
experience of hundreds of thousands of other farmers in all sections of the country.

Starline, Inc. has functioned as a clearing house for ideas, plans, methods, and equipment, which have proven to be both practical and profitable.

Starline, Inc. has been accumulating this information, so that today there is no source of information on farm buildings and their equipment that is more comprehensive or authoritative.

For over fifty years Starline, Inc. has been relaying on to its representatives all this information as it is received so that today more than ever before the Starline representative in any section of the country is a thoroughly informed, practical man with the latest ideas, plans and methods relative to farm buildings and equipment.

The customers of Starline who are friends and boosters, testify to the value of the Starline ideas because they have benefited by the experience of thousands of



FIFTY YEARS

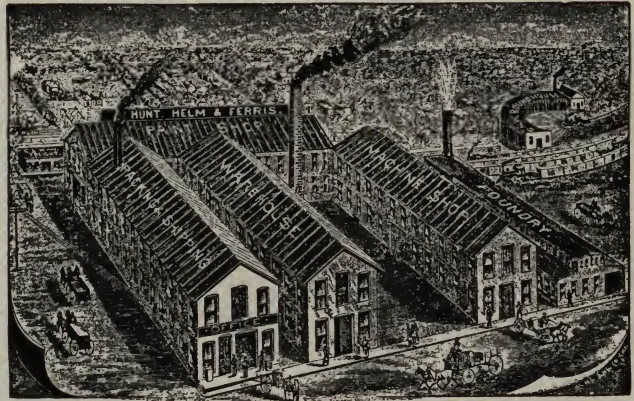
other farmers, thereby avoiding the losses of ill-advised plans.

For over fifty years farmers all over the country have regarded the Starline representative with confidence because he could always be relied upon to see them through their problems satisfactorily, economically, and profitably.

The benefit of this accumulated experience is offered freely and without any obligation to any who might benefit by it in connection with the building of a new farm structure or turning an old one into a practical money maker.

During this same period of more than half a century, Starline, Inc. has been a leader in barn equipment design. It has constantly maintained a thoroughly practical Experimental Department where ideas and equipment have been given rigorous tests under practical conditions before they have been offered to the public.

The result is that the features and ideas embodied in Starline equipment itself have a value which shows up profitably in every day use in the saving of feed, time and labor and the elimination of useless steps, with

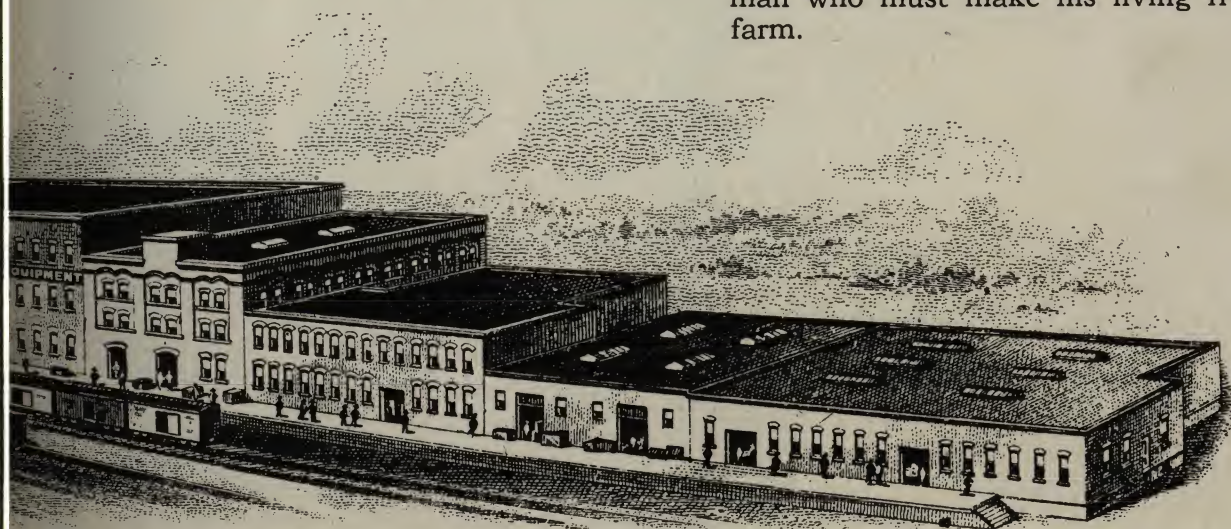


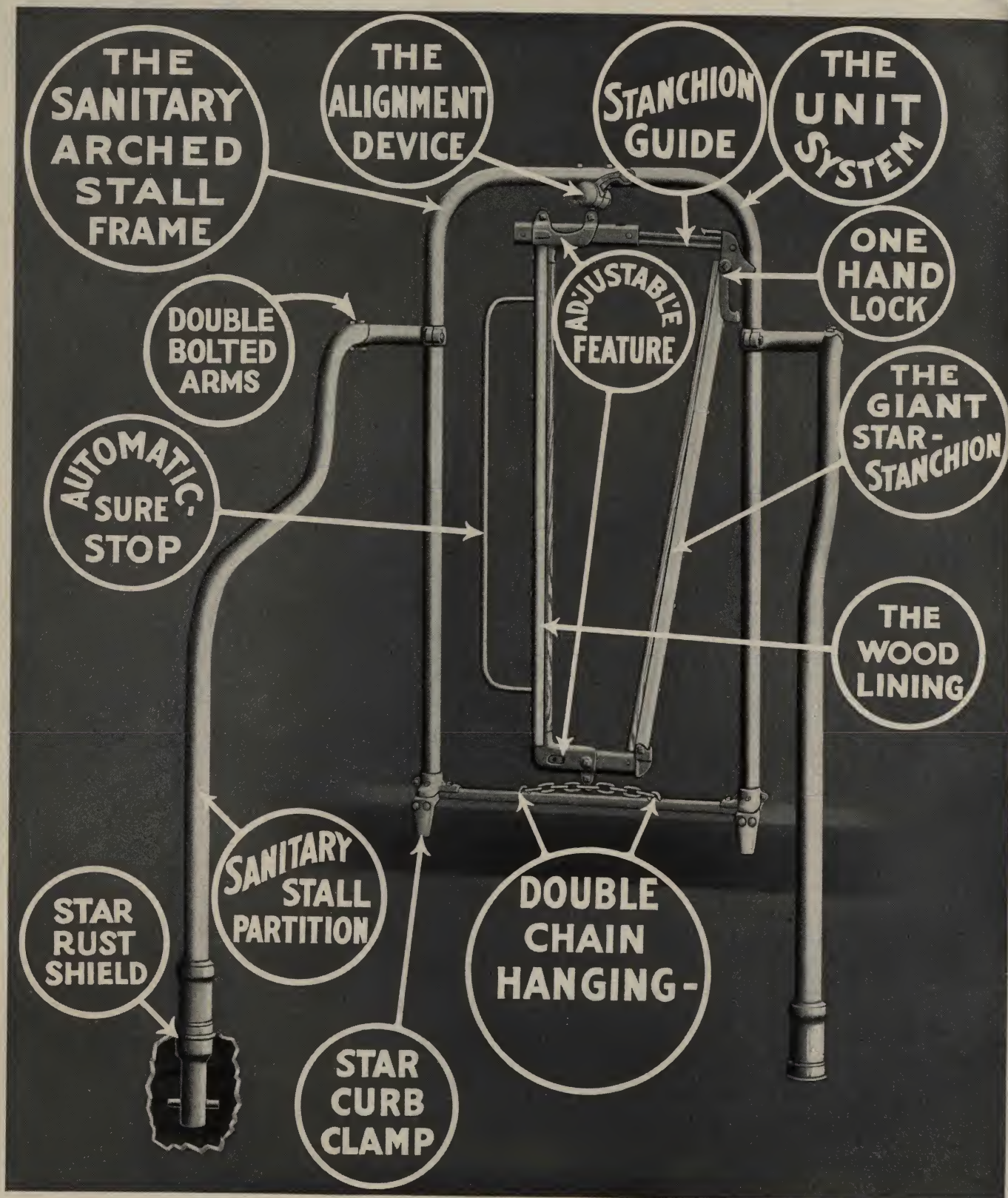
Here's "the factory" in 1895

added comfort and safety to cows and greater profits from them through lower costs and increased production.

The Starline features described on the following pages are the result of over fifty years of experience and service in designing and manufacturing and they account for the fact that Starline equipment is bound to be the first choice where the practical value of equipment is considered.

These features answer every fancy of the man who builds the most elaborate barn as well as meeting the needs of the man who must make his living from the farm.





EXCLUSIVE STAR FEATURES



Showing how STAR Stalls may be added or removed under the Unit System

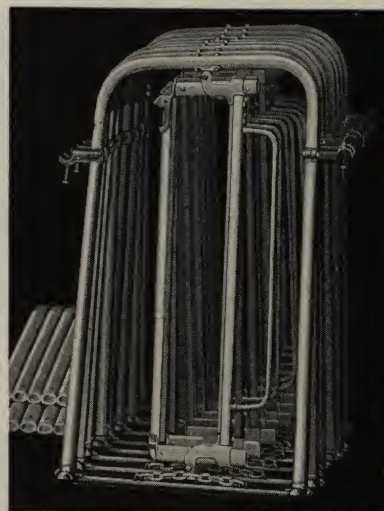
*Exclusive
Star
Feature*

The Star Unit System

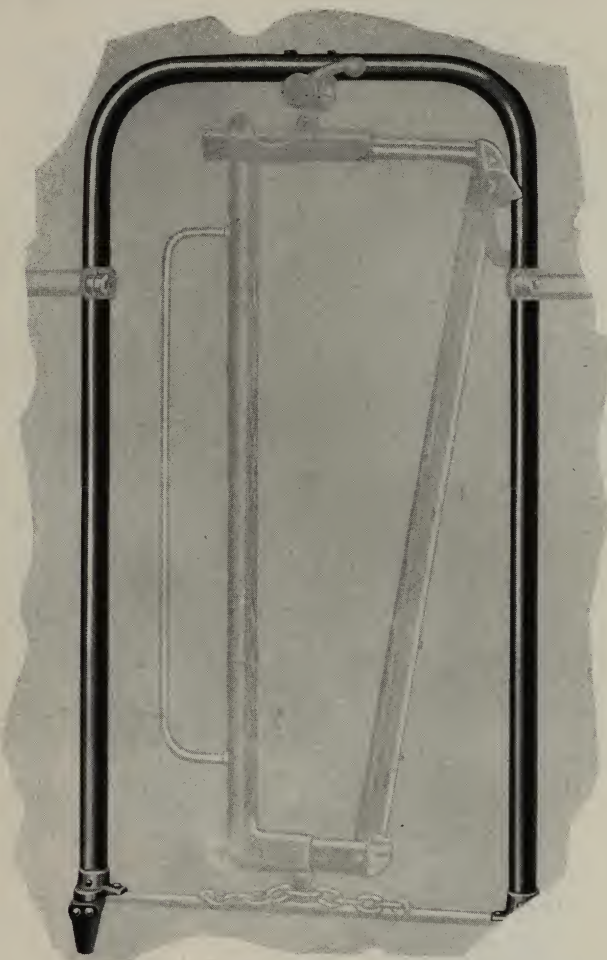
“Grows with your Herd — One Stall or a Hundred”

HERE is one of the main reasons why all dairy-men prefer STAR Unit Stalls. Unit Stalls are built individually. Each stall is a separate unit and connects with the next on either side. You can install as many as you need to exactly fit your herd. And you can always add more as your herd increases.

This exclusive STAR feature saves much in installation expense. The stalls go into the barn just as they leave the factory. Simply clamp them to the concrete curb and you have the complete unit, stanchion and all, ready for business.



This Shows the way STAR Stalls come to you—ready for installation the minute they arrive



Star Stall Arch

Shows the Quality of Star Equipment

QUANTITY is sometimes hard to see. In some cases it can be proved only by the test of time. The smooth surface of a piece of pipe tells very little about its strength or toughness.

But you can be sure of the quality of STAR Stalls. The quality of this pipe is not a mere matter of specifications. Every single piece must be right or it will not go through machines where every piece of pipe used in STAR Unit Stalls is bent to shape without heating.

The cost of STAR Stalls could be reduced by using steel tubing such as is commonly used and is available in various weights and thicknesses of walls, but experience has proved that steel tubing is more brittle than pipe and that unwelded seams are not as substantial.

Because of the practical test that every piece of pipe undergoes it is impossible to use brittle or thin material. Only the highest grade of full weight, butt welded steam pipe can be used in the manufacture of STAR stalls.

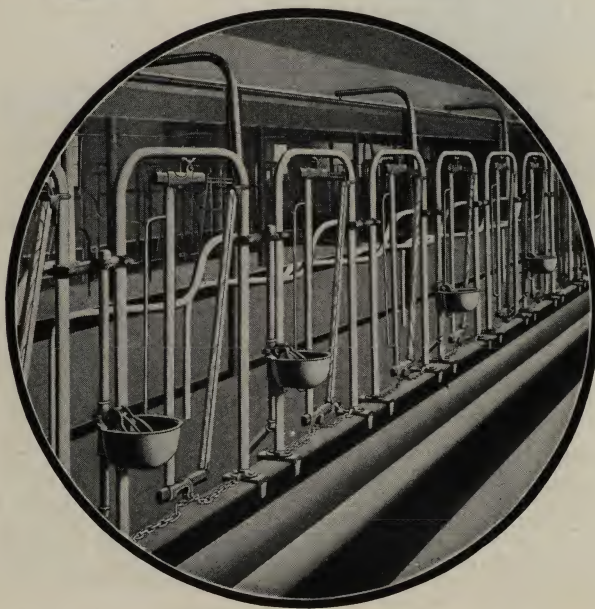
You take absolutely no chances with the quality of STAR Stalls because the toughness of the steel is proved. If it wasn't the toughest kind of steel it wouldn't go through the cold bending process to which every piece of STAR Unit Stalls is subjected.

Another big advantage of the arch construction is that it does away with the clamp irons, couplings and other devices along the top. It is a smooth, one-piece construction. This is one reason why STAR Equipment is the choice where the most rigid rules of sanitation are complied with.

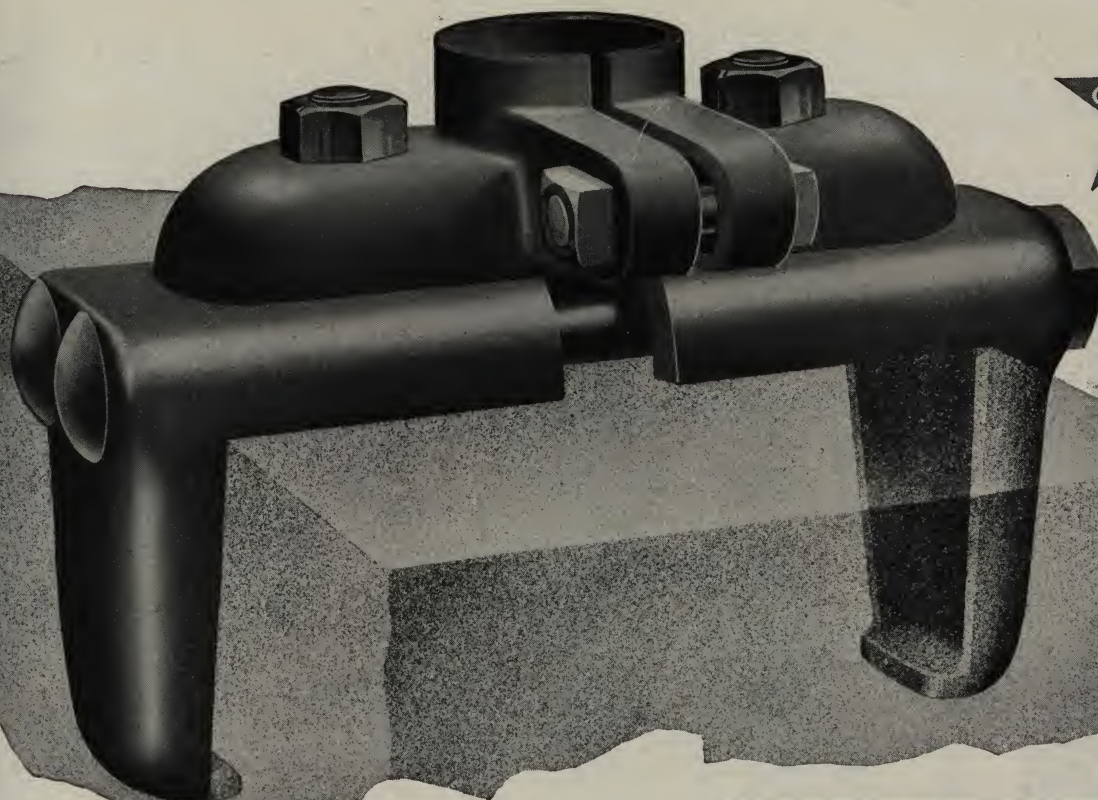
The certified malleable iron we use is recognized as the best material for connecting parts such as stall arms and stanchion hangings and every piece of malleable iron is thoroughly tested and inspected before it is permitted to become a part of STAR Equipment.

Even the bolts used in STAR Equipment are chosen with care. Rolled thread bolts are avoided and only cut thread bolts are used where it is necessary that the holes through which the bolts are inserted be made a close fit for the shank of the bolt. This insures a solid construction.

The result of the right selection of materials for STAR Equipment is of vital importance. It gives you not merely a more sanitary equipment but it is more durable and lasting and a better job of installation.



*Exclusive
Star
Feature*



No. 685 Star Curb Clamp

"Sixty Seconds Sets a Star Stall"

THIS simple device has answered a big problem in barn equipment installations. It does away with anchors or templates. It enables you to go ahead with your concrete or cement work and finish the job before the equipment reaches you. It enables you to build the floor and curb with less work and at less expense, and to avoid the possibility of costly errors in getting stalls in the wrong place. It simplifies the entire job of installation.

Simply drop the curb clamps over the curb and tighten the bolts. Then bolt the stall arches to them and the job is done. Simple and convenient, and a permanently satisfactory installation.

The take-up feature of the STAR Curb Clamp insures a perfectly solid and satisfactory job after years and years of continuous hard use.

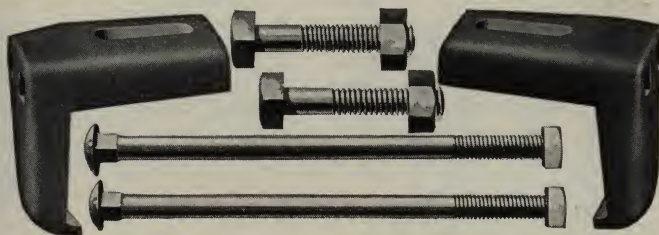
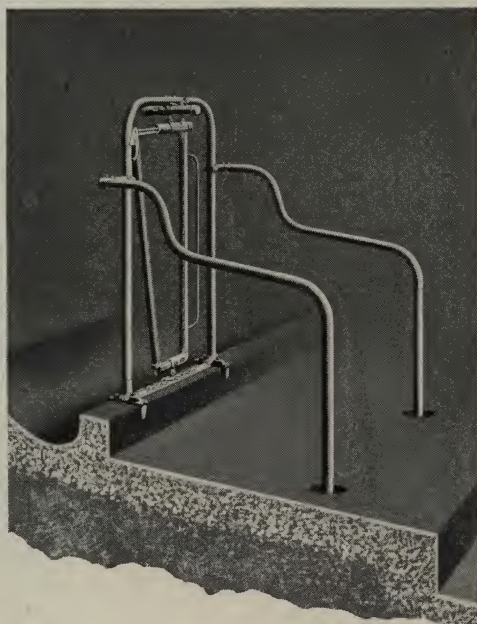


Fig. 685

The STAR Curb Clamp consists of just two malleable jaws, adjustable to the curb by means of draw bolts.



By leaving six inch holes in the cow bed the distance apart that the stalls are wide, you are enabled to clamp the stall arches to the curb and to fill in around the partitions with thin, rich cement.



Photographs taken in one of the STAR Test Barns. Note how STAR Alignment Device keeps every cow in line at the gutter.

No. 765 Star Alignment Device

It does not matter whether the cow goes into the same stall each time or not. The Alignment Device instantly aligns her at the gutter. Regardless of how the herd changes, the STAR Alignment Device instantly adjusts the stanchion to the animal.

Here is the only alignment device which can be adjusted quickly enough to make it practical. It's the result of the experience and engineering skill back of STAR Equipment. It's one of the features that give the STAR Line leadership.

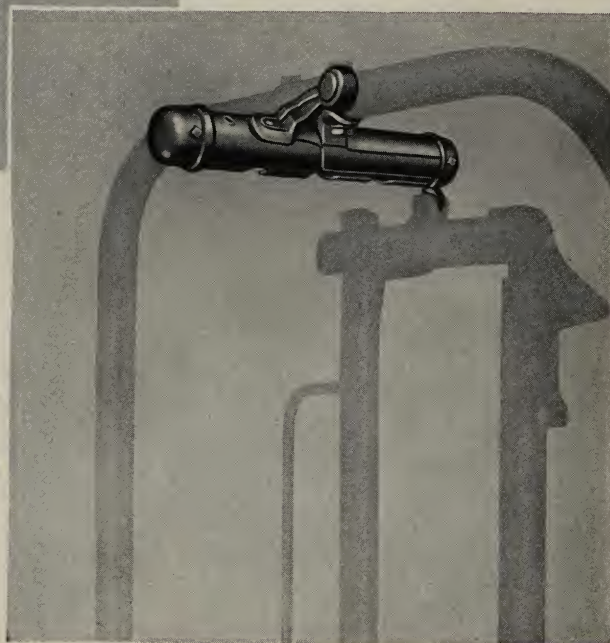
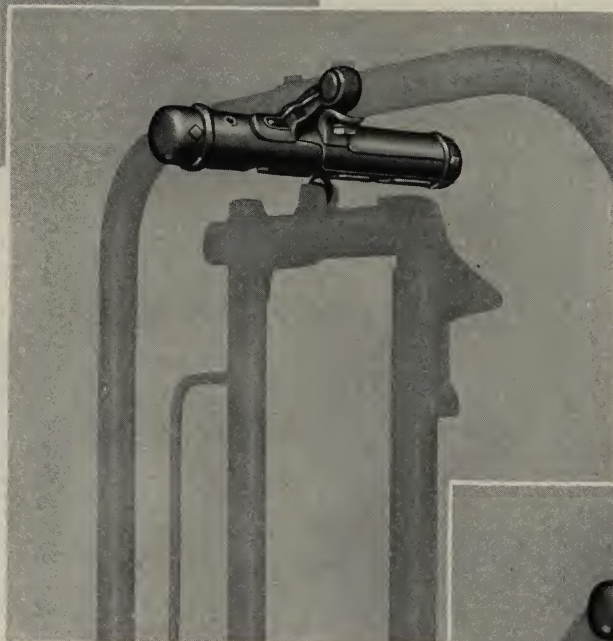
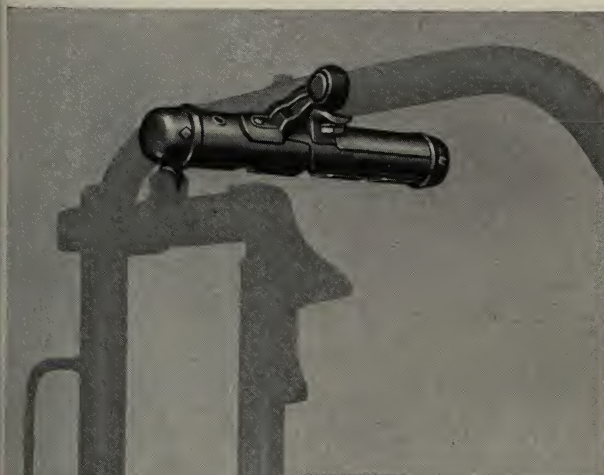
The stanchion can be placed in any of five different positions over eleven and one-half inches of space. The illustration at the top shows the stanchion moved forward for a long cow. The second illustration shows the stanchion in the center position for the average cow and the lower view shows the stanchion moved back for a short cow.

If a cow stands correctly, with her heels at the drop, the bedding keeps clean and so does the cow. This is a long step toward the production of clean milk without the costly labor of cleaning the cow.

The STAR Alignment Device provides for this. It instantly lengthens or shortens the cow bed, and it takes no longer to make the adjustment than it does to lock the stanchion.

The adjustment is made instantly after the cow is in the stall. So easy to operate that a small boy can do it. No tools needed. Not even a monkey wrench. Just raise the lever and move the stanchion forward for large cows or backward for short cows. Five different positions in eleven and one-half inches.

Specify No. 765W when Alignment Device for wood frame is wanted.



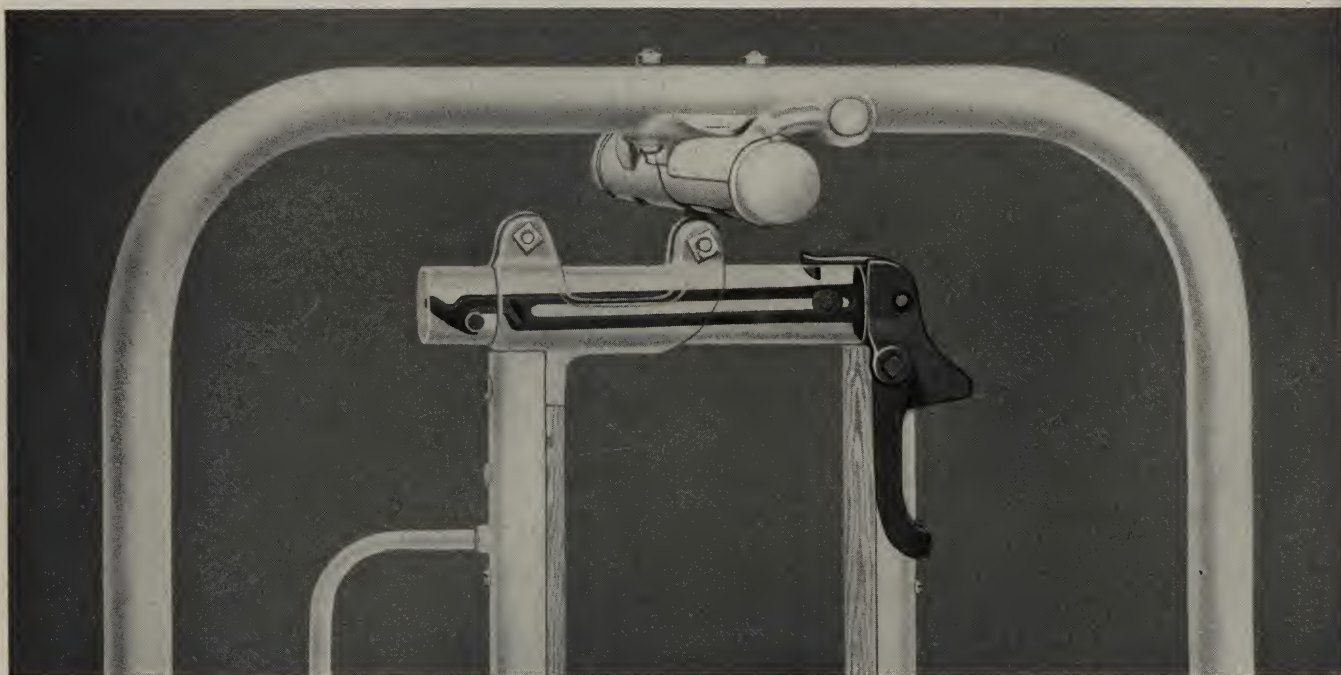
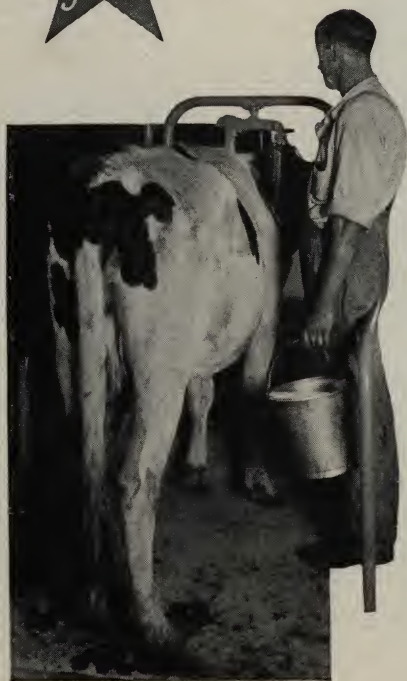


Fig. 510



The Star One-Hand Lock

Four Big Advantages



ONE—The STAR Stanchion is easily opened with one hand. You don't have to set down your pail of milk in order to turn your cow loose. And, when it is open, it is in position to receive the cow when she returns again to the stanchion. The movable bar of the stanchion being equipped with a locking guide, it can be easily closed with one hand.

TWO—The fork or crotch device on the lock straddles the side of the stall arch, which prevents the stanchion from swinging and holds it in place while open.

THREE—The guide of the One-Hand Lock of the STAR Stanchion removes all strain on the hinge, preventing the breaking of the hinge castings. It also insures the prefect operation of the lock even after years of wear.

FOUR—The double latch, each part locking the stanchion independently of the other part, makes it absolutely cowproof.



The Star Stanchion Adjustment

YOU can adjust the width of the STAR Stanchion instantly to fit the neck of a bull or cow, a young heifer or small calf.

It adjusts in neck width from 5 to 9 inches by loosening two bolts at the top and one at the bottom.

This is a feature that means much in saving of time and labor and economy of room.

In the first place, by having the stanchions adjustable, it is not necessary to purchase special equipment for young stock. Even if you do go to the extra expense of having special equipment for your young stock, you can't tell when you buy your equipment how your herd is to be divided as to young and old stock next year.

As long as the stanchions can be instantly adjusted, without taking them out of the stall arches, it is possible to keep your barn properly equipped all the time, and no matter how your herd changes, the stanchions fit.



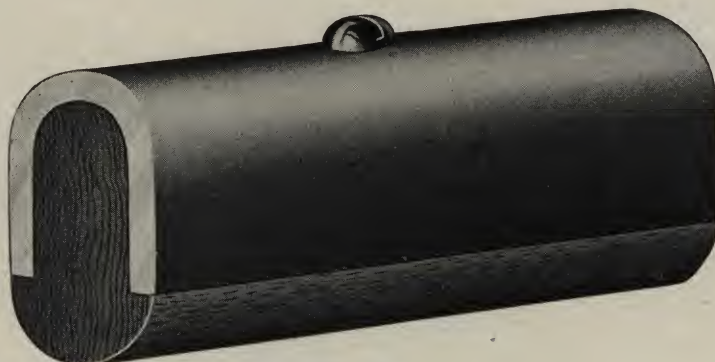


Fig. 537



The Star Wood Lining

"A Big Little Thing"



THE STAR Stanchion has a wood lining which is there for keeps. It is fastened as securely to the metal as if it had grown there. Nothing much less than blasting powder will tear it off.

Wood linings are necessary to the comfort of the animals.

But **MOST** wood linings are not permanent. They are held only by short screws and are easily crowded off.

Not so with the Wood Lining of STAR Stanchions. It is not merely "hung on" with screws, but is **FORCED** into the U-bar—wedged in—and cannot possibly be loosened by the cattle.

In addition to that we have made it **EXTRA** safe by an added anchor of screws **FROM** the **BACK**, which go one and a quarter inches into the kiln-dried, hard maple of which it is made.

You'll never have the petty annoyance and expense of replacing wood linings if you buy the Star Stanchion.

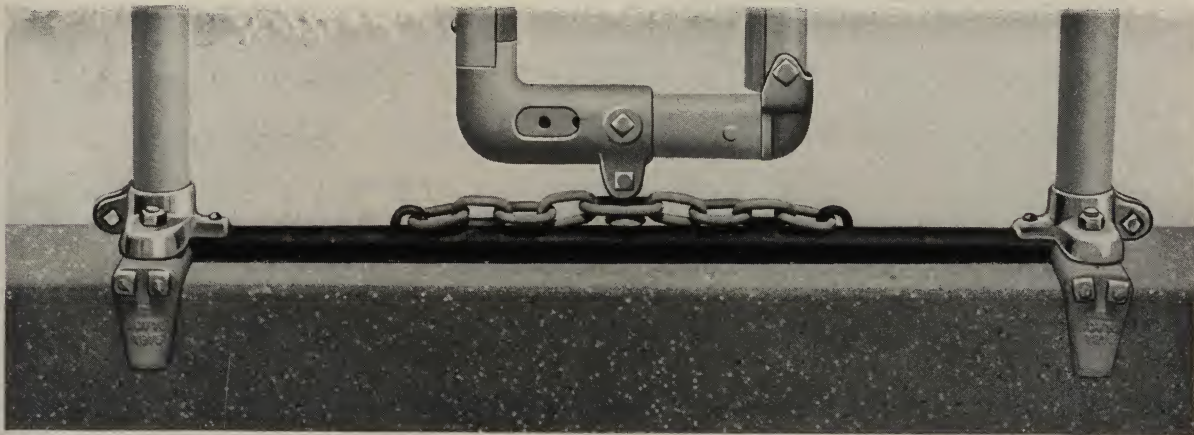


Fig. 511

The Star Double Chain Hanging

ANOTHER exclusive feature that means STAR leadership. The double chain on STAR Stanchions is practically noiseless—no rattling or clanking to disturb the peace and comfort of the cows.

All the “play” is backward and forward. This enables the cow to get up without inconvenience and without bruising her shoulders.

There is no “play” from side to side. The cows are kept in the center of their respective stalls and are prevented from reaching over and stealing each other’s feed.

This manner of hanging stanchions saves the need of cut-outs in the curb. The stanchion hangs low enough for comfort without the curb being cut out. These cut-outs are not only expensive to make but allow the cow to work feed back into the stall and waste it. A level curb prevents the waste of feed. Feed costs money. You can’t afford to let cows waste it.

The fact that there are no connections between the stanchion and the curb means that you will never be obliged to tear out any concrete work to make any replacements—there

are no anchors to set, no bolts to place, no threads to strip. If you have ever torn out any concrete work, you will know what this saving means.



No. 809 Star Automatic Sure Stop

THIS is a simple device, but it saves lots of time and work.

Did you ever see a cow that wouldn't put her head in the wrong place if she could? That seems to be her nature. It is very annoying to have a cow poke her head in beside the stanchion and have to back her up before you can stanchion her. It wastes time, too.

When a cow enters a STAR Stall with the stanchion open, where the sure stop is used there is only one place where she can put her head and that is right into the Stanchion.

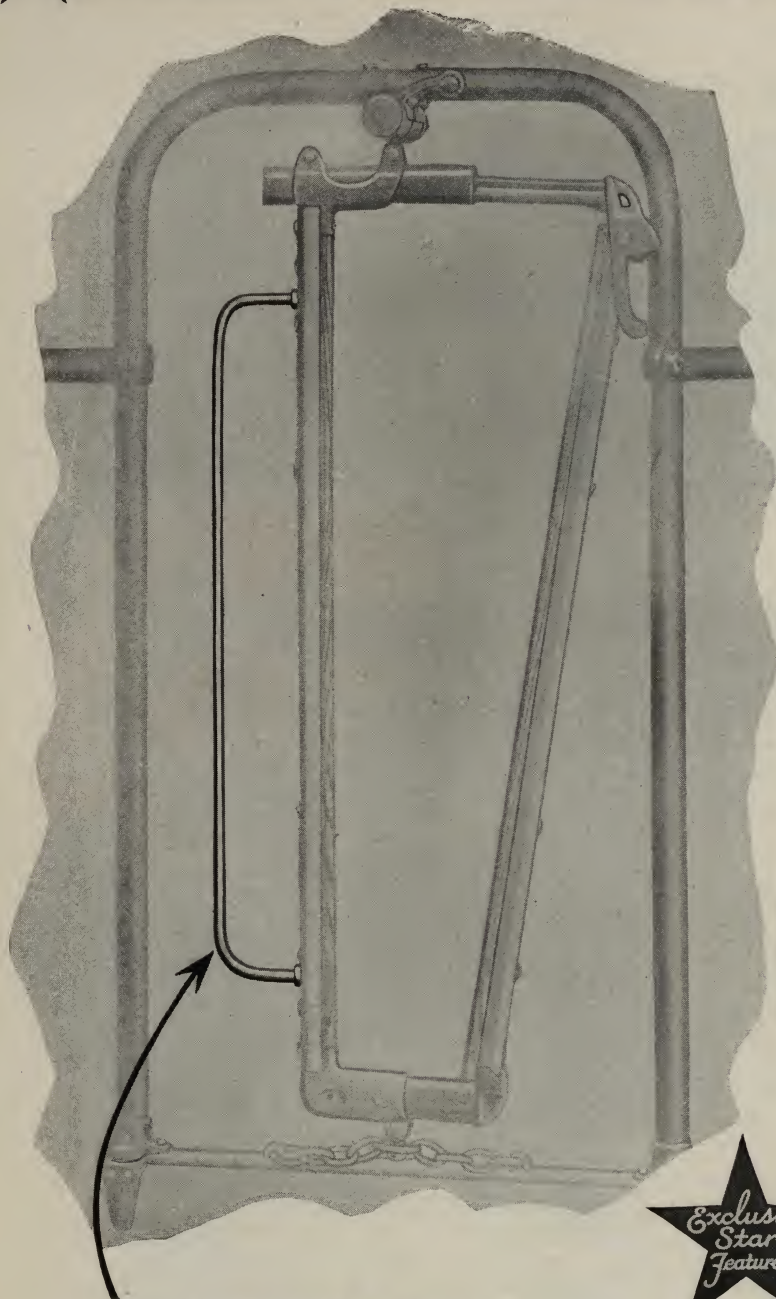
There is no other place for it.

The STAR Automatic Sure Stop keeps her head from going in on one side. The locked fork keeps her head from going in the other.

This device is a simple bowed steel bar attached to the side of the stanchion.

It swings with the stanchion, so that it in no way interferes with the freedom of the cow.

It is always in place, but never in the way. It never needs attention and saves valuable time when the herd enters the barn.



STAR Automatic Sure Stop Keeps
Cows' Heads out of Here

*Exclusive
Star
Feature*

The Star Lock-Open Device

On the outer part of the lock on the Star Stanchion is a forked device. The two parts of this fit the side of the stall arch. They hold the stanchion in place and prevent it from swinging when open.

No. 1168 Star Rust Shield

For Stall Partitions

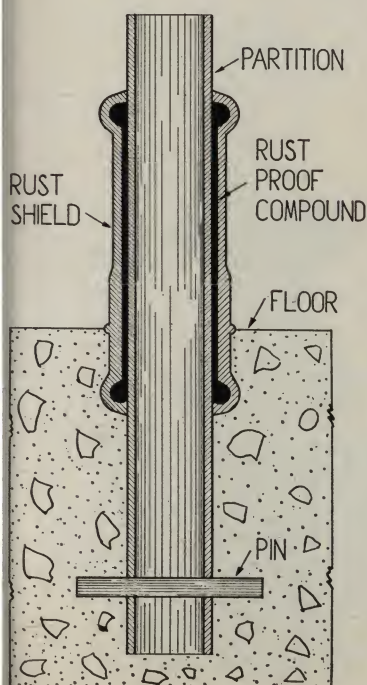
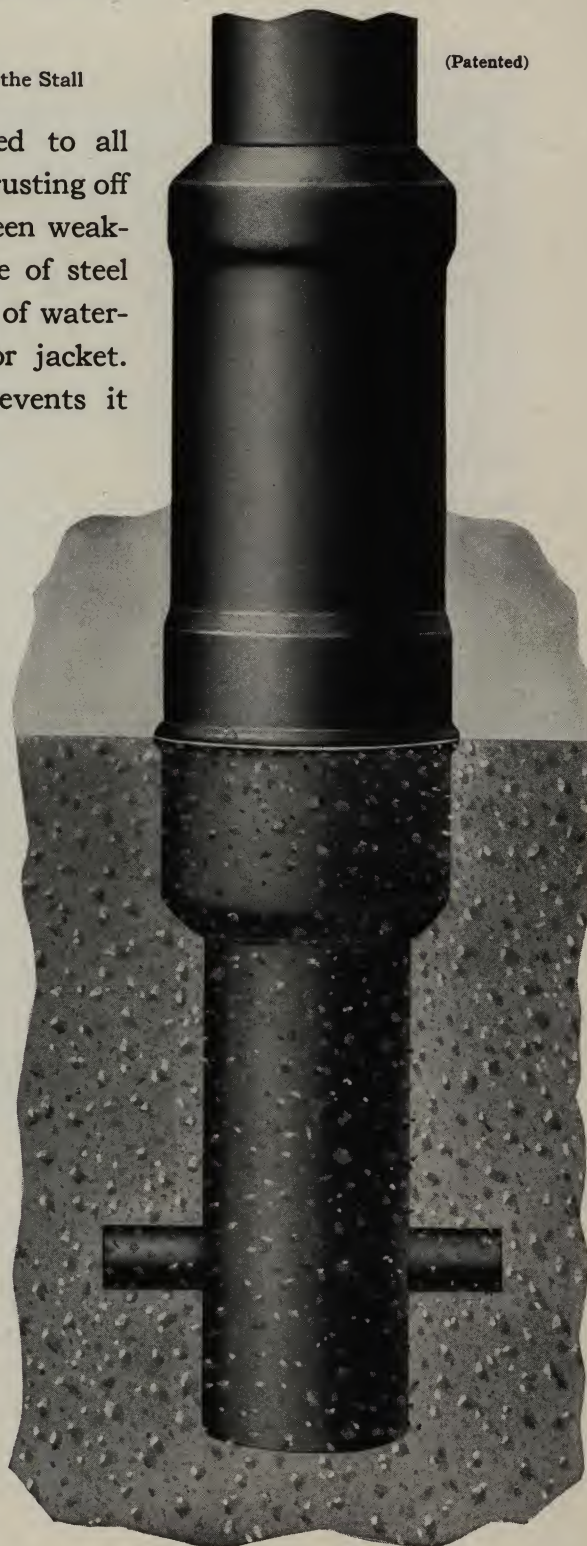
Prevents Partitions Rusting Off at Floor and Doubles the Life of the Stall

THE STAR RUST SHIELD can be applied to all STAR Stall Partitions to prevent them from rusting off at the floor. It does away with an unforeseen weakness which was formerly common to every make of steel stalls. It consists of a heavy, rustproof coating of water-proof preservative in a malleable iron sleeve or jacket. This jacket covers the rust-proof coating and prevents it from being worn, rubbed or knocked off.

Before a partition leaves the factory the loose-fitting, malleable shield is fastened firmly at the proper place near the end of the partition by being "pinched" in a heavy press. It is then filled with the preservative, which is forced inside the chamber between the partition and the iron shield under heavy pressure. It fills this chamber with a layer of preservative about one-eighth of an inch thick. (See Page 4.)

The partition is the main support of the stanchion frame. If the partition rusts off and lets go, everything goes. So the STAR Rust Shield, by saving the partition, saves the whole framework of the stalls and thus virtually doubles the life of the stall.

(Patented)





Star Unit Stalls Are Double Post Stalls



The Star Unit Stalls in the upper row have twice as many uprights or stall posts as our "straight line" stalls below

THE STAR Stall Arch gives the cow all the room she requires for freedom and maximum comfort. It is an improvement over the single post stall because, even without a sure stop, there is not room for the cow to walk through into the feed trough by going between the stanchion and the stall post of the STAR Unit Stall.

The arch construction also does away entirely with clamps along the top rail, leaving a smooth, rounded top that is not only distinctively neat but is much easier to clean and to keep clean.

STAR Unit Stalls provide double the number of uprights that come with single post stalls. These double posts not merely make the stall much stronger but also prevent the cows from working costly feed back into the stall where it would be trampled under their feet and wasted.

No. 1071 Star Stall Partition Socket

THE STAR Stall Partition Socket is made of two pieces of malleable iron which form a clamp that fits the end of any $1\frac{5}{8}$ in. O. D. pipe or tubing.

Where used at the end of a stall partition it reinforces the partition right at the point where it receives the greatest strain and also protects it from rust.

The STAR Stall Socket makes it possible to replace in concrete any stall partition or other $1\frac{5}{8}$ in. O. D. pipe which has become broken or rusted off at the surface of the concrete. Simply remove the stub or piece that is left in the concrete, making a rough hole. Clamp the socket on to the end of the pipe or partition. Insert it in the hole and fill in around the base of the socket with a thick, rich mixture of concrete.

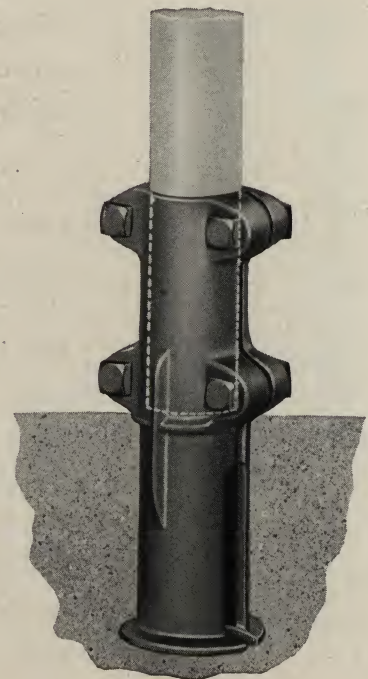


Fig. 1071

How We Get That Permanent Finish on Star Equipment

THE appearance of STAR Equipment installed in a barn is greatly enhanced by the smooth and lasting finish that is applied to all STAR Equipment before it is shipped.

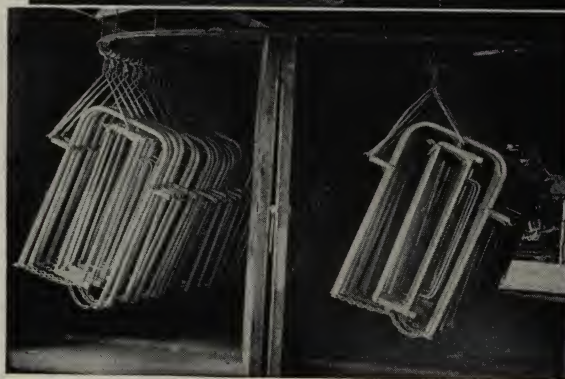
This permanent finish can be secured only when applied to a clean surface which has been properly prepared.

All material used in STAR Equipment is given a mechanical treatment which removes mill scale, grease, oil or other foreign matter and insures a perfectly smooth, clean surface on which the enamel is to be applied.

A permanent finish applied on steel must be of exceptional quality to withstand the variation in temperature in the dairy barn. It must have elasticity to absorb the expansion and contraction of the steel.

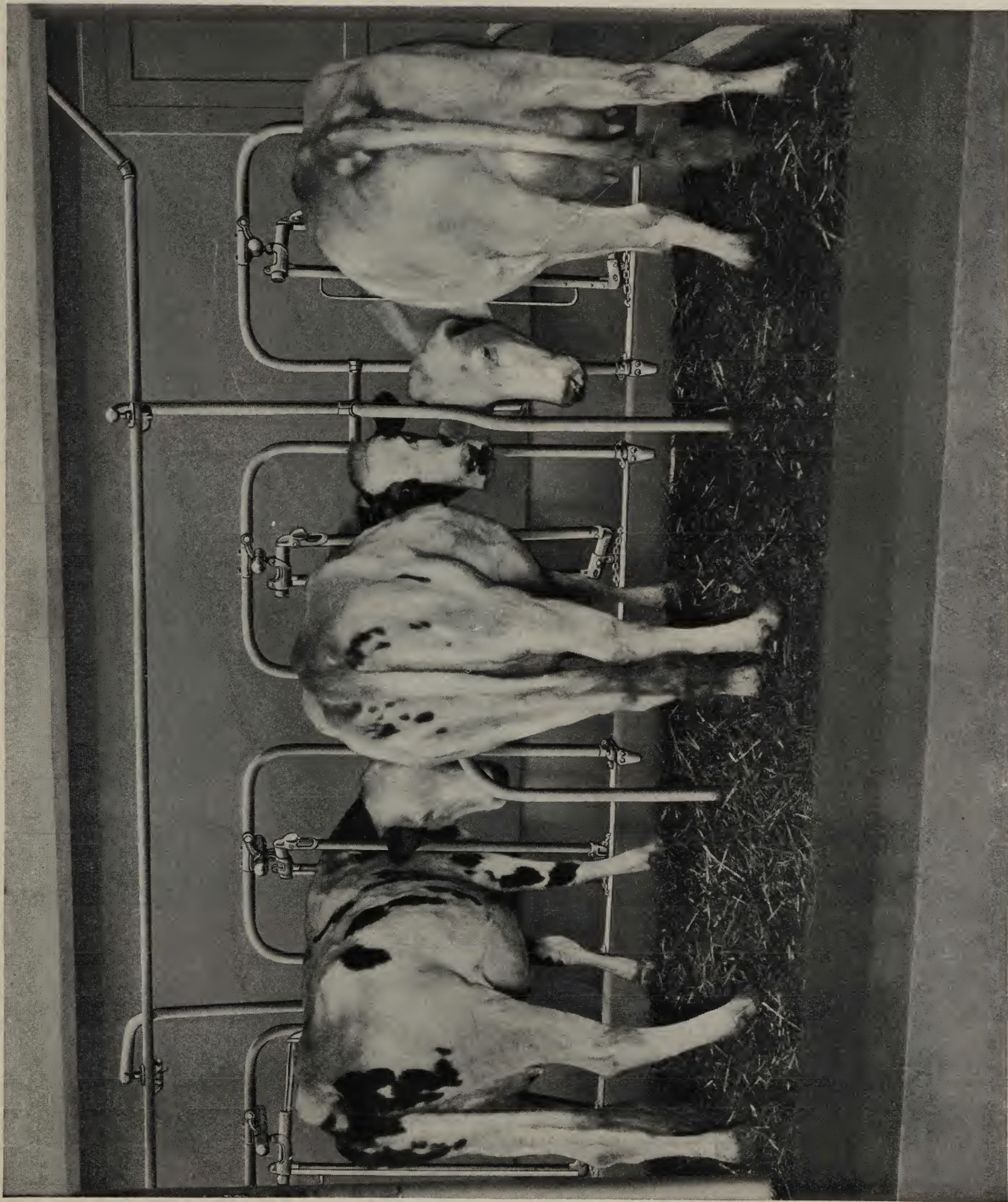
The special gray enamel on STAR Equipment was selected after long experimenting, to get the most attractive and lasting appearance, and embody necessary qualities to resist rust and to withstand the ammonia and gases in the barn.

An even coat of enamel and a perfectly smooth finish is secured by dipping the complete piece right into the enamel so that it receives a protective coating inside and out. After being dipped and thoroughly covered with enamel it is



conveyed to ovens where the enamel is thoroughly baked on.

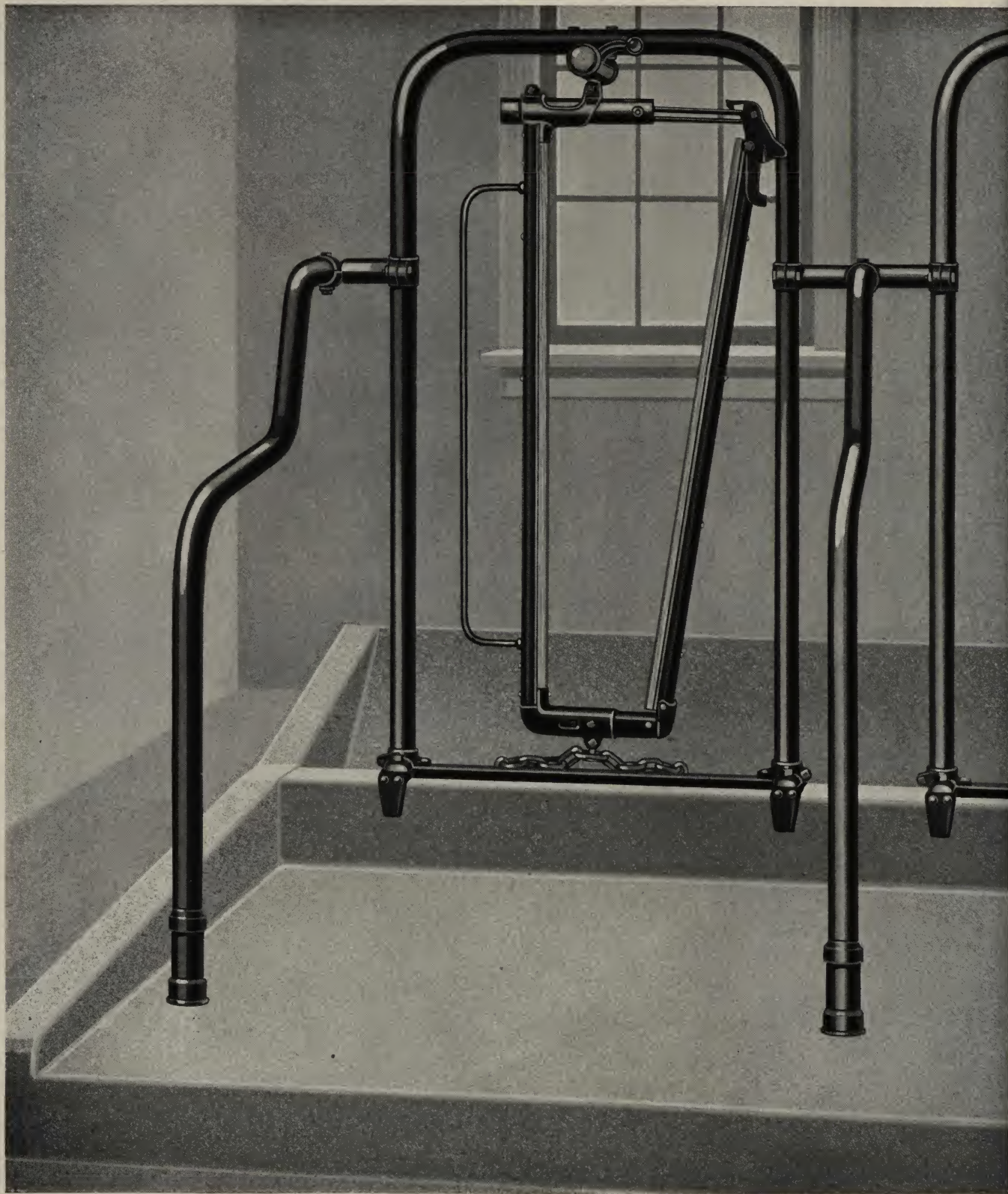
The care and thought given to the finish of STAR Equipment assures not only an even color and a more attractive appearance but provides protection for the carefully selected materials of which it is built and makes STAR Equipment last even longer.



Star Stalls Afford Plenty of Freedom for Cows to Look Behind Them



Plenty of Room for Cows to be Milked in STAR Stalls in the Barns of French-Bauer Dairy Co., Cincinnati, Ohio.



No. 10 STAR Unit System Steel Stall Equipped With Giant STAR Stanchion, Automatic Sure Stop, STAR Alignment Device, STAR Curb Clamps and STAR Rust Shield

No. 10 Star Unit System Steel Stall

Equipped with Giant STAR Stanchion, Automatic Sure Stop, STAR Alignment Device, STAR Curb Clamps and STAR Rust Shield

SPECIFICATIONS

ARCH STAR "Unit System;" patented; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in. (Page 6). Adapted to any width stall by using longer or shorter stall arms—regular widths, 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in.; 3 ft. 6 in. width furnished unless otherwise specified. Double Bolted Stall Arms illustrated (Page 41). Width, 28 in. Height over all, 61 in. above stall floor.

PARTITIONS STAR Triple Bend Stall Partitions; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in. Fitted with Star Rust Shield (Page 15).

STANCHION Giant STAR Stanchion No. 486; patented; adjustable in neck space from 5 in. to 9 in. (Page 11); one-hand, cow-proof lock; malleable guide removes strain from hinge; lock-open device (Page 14); protected hinge; swivel hanging at top and double chain hanging at bottom (Page 13). Uprights are high carbon steel U-bars, $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in., completely filled with kiln dried hard maple linings driven in and secured by $1\frac{1}{4}$ in. drive screws (Page 12).

SURE STOP STAR Automatic; made from $\frac{1}{2}$ in. bowed steel; permanently secured to stanchion upright; operates automatically with stanchion (Page 14).

ALIGN-STAR
MENT Align-
DEVICE ment
Device; patented; instantly adjustable with cow in stall; built entirely of steel and best grade malleable iron; provides for extreme adjustment of $11\frac{1}{2}$ in. (Page 8).

CURB STAR
CLAMPS Curb
Clamps; patented; built of best grade malleable iron;

jaws connected by $\frac{3}{8}$ in. x $7\frac{3}{4}$ in. draw bolts (Page 7).

RUST SHIELD Malleable Shield filled with rust-proof preservative fitted to partition. Prevents partition rusting off at the floor line (Page 15).

FINISH After all machine work has been done on the material entering into the construction of this stall, the mill scale, grease, or other foreign matter is thoroughly removed by a special cleaning process. It provides a thoroughly clean surface for the rust and ammonia resisting gray enamel, which is then applied and baked on permanently (Page 17).

WEIGHT—Average weight per stall, 90 lbs.
Weight of Extra Stall Partitions, 17 lbs.

MANGER PATTERN Furnished free upon request; made of hard wood; to be used as pattern for shaping concrete mangers.

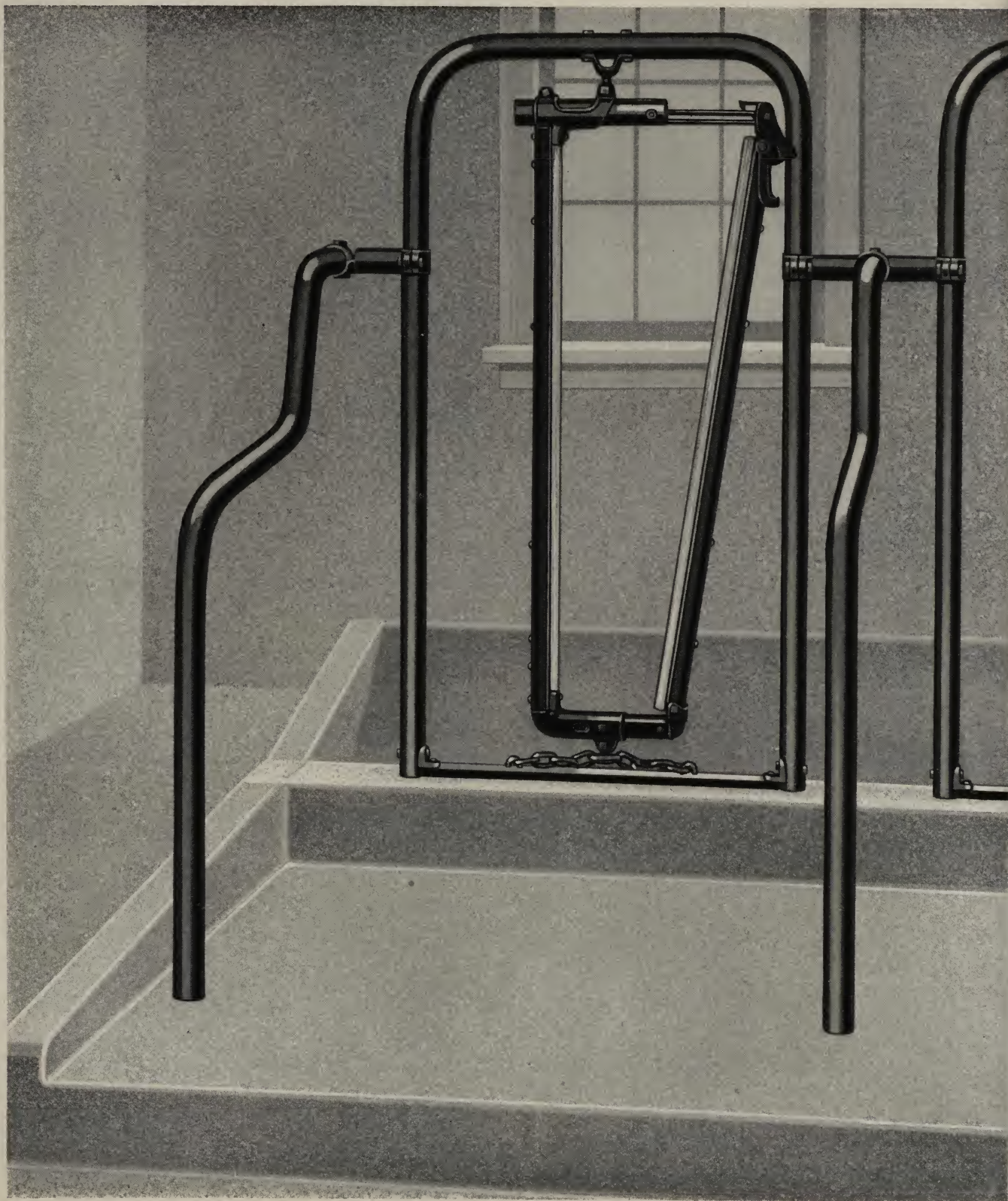
SPECIAL NOTE

STAR Manger Partitions, Water Bowls, or Name Plates can be added to the No. 10 STAR Steel Stall at any time desired.

STAR Stalls always shipped completely assembled and ready to install (Page 5).



Star Equipped Dairy Barn on the Farm of H. Krienke, Hutchinson, Minn.



No. 13 STAR Unit System Steel Stall Equipped With Giant STAR Stanchion

No. 13 Star Unit System Steel Stall

Equipped with Giant STAR Stanchion

SPECIFICATIONS

ARCH STAR "Unit System;" patented; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in. (Page 6). Adapted to any width stall by using longer or shorter stall arms—regular widths, 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in.; 3 ft. 6 in. width furnished unless otherwise specified. Double Bolted Stall Arms illustrated Page 41. Width, 28 in. Height (over all), 61 in. above stall floor.

PARTITIONS STAR Triple Bend Stall Partitions; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in.

STANCHION Giant STAR Stanchion No. 486; patented; adjustable in neck space from 5 in. to 9 in. (Page 11); one-hand, cow-proof lock; malleable guide removes strain from hinge; lock-open device (Page 14); protected hinge; swivel hanging at top and double chain hanging at bottom (Page 13). Uprights are high carbon steel U-bars, $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in., completely filled with kiln-dried hard maple linings driven in and secured by $1\frac{1}{4}$ in. drive screws (Page 12).

FINISH After all machine work has been done on the material entering into the construction of this stall, the mill scale, grease or other foreign matter is thoroughly removed by a special cleaning process. It provides a thoroughly clean surface for the rust and ammonia resisting gray enamel, which is then applied and baked on permanently (Page 17).

WEIGHT Average weight per stall, 76 lbs.
Weight of extra stall partitions, 15 lbs.

MANGER PATTERN Furnished free upon request; made of hard wood; to be used as pattern for shaping concrete mangers.

ADDITIONAL EXCLUSIVE FEATURES

STAR Steel Stall as illustrated on the opposite page can be equipped with the following additional features at factory before shipment is made.

STAR Rust Shields. (See page 15.)

STAR Curb Clamps. (See page 7.)

STAR Automatic Sure Stop. (See page 14.)

The following features may be added at any time:

STAR Alignment Device. (See page 8.)

STAR Manger Partition. (See page 44.)

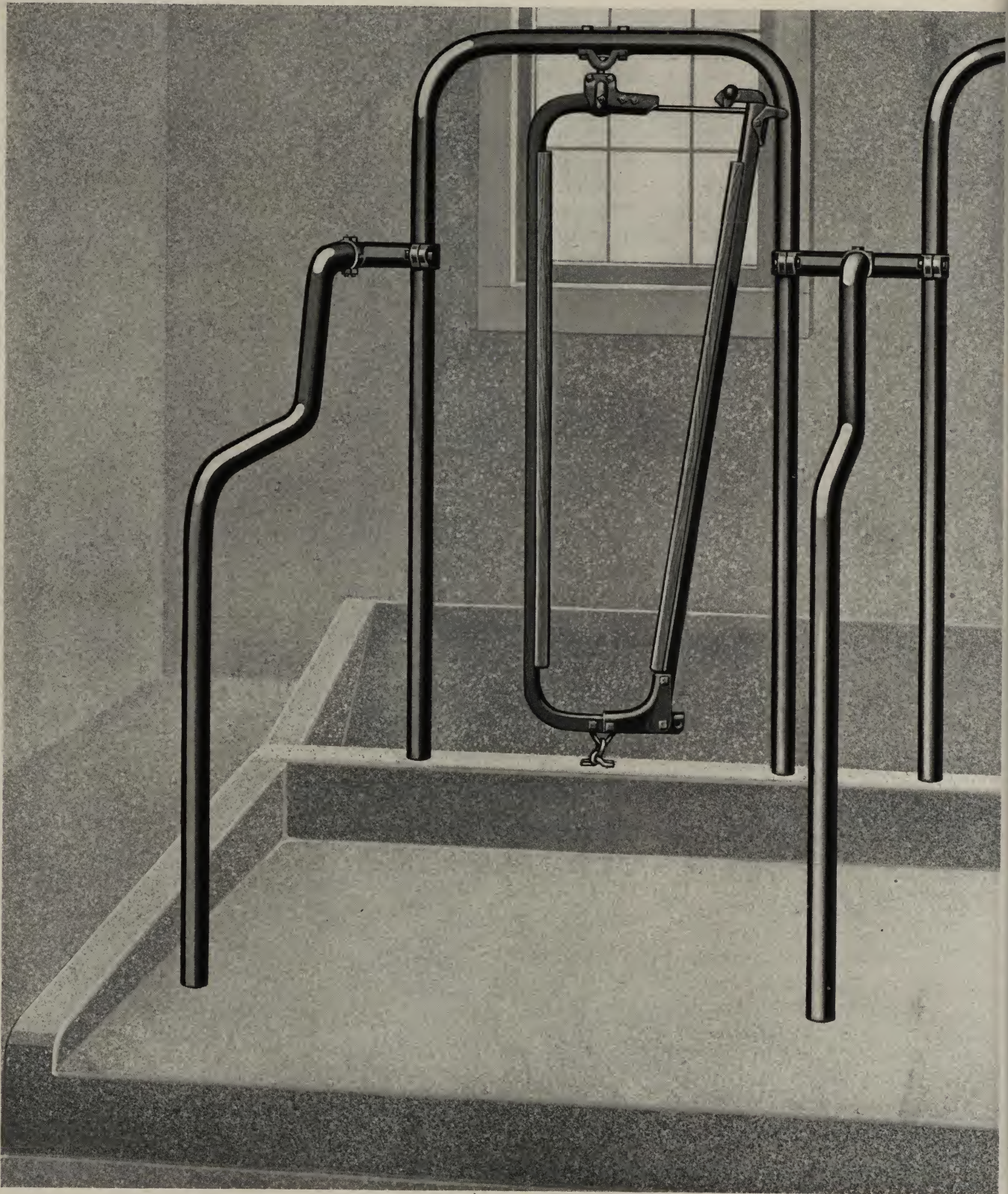
STAR Water Bowls. (See page 48-53.)

STAR Name Plates. (See page 46.)

STAR Stalls always shipped completely assembled and ready to install (Page 5).



Cows on Mr. Vincent Astor's estate at Rhinebeck, N. Y., are stanchioned in STAR Stalls.



No. 27 STAR Unit System Steel Stall Equipped With No. 1211W STAR Adjustable Wood Lined Stanchion

No. 27 Star Unit System Steel Stall

Equipped with No. 1211W STAR Adjustable Wood Lined Stanchion

SPECIFICATIONS

ARCH STAR "Unit System;" patented; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in. (Page 6). Adapted to any width stall by using longer or shorter stall arms—regular widths, 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in.; 3 ft. 6 in. width furnished unless otherwise specified. Double Bolted Stall Arms, illustrated Page 41. Width, 28 in. Height, 61 in. (over all) above stall floor.

PARTITIONS STAR Triple Bend Stall Partitions; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in.

STANCHION STAR Stanchion No. 1211W; patented; adjustable in neck space from $4\frac{1}{2}$ in. to $8\frac{1}{2}$ in.; one-hand, cow-proof lock; malleable guide removes strain from hinge; lock-open device; protected hinge; swivel hanging at top and single chain bottom fastening with heavy malleable anchor in curb. Uprights are high carbon steel U-bars $1\frac{1}{4}$ in. x $1\frac{1}{16}$ in., with hard maple linings. Crosspieces are made of high grade steel, securely bolted and held in place by malleable iron braces (Page 30).

FINISH After all machine work has been done on the material entering into the construction of this stall the mill scale, grease, or other foreign matter is thoroughly removed by a special cleaning process.

It provides a thoroughly clean surface for the rust and ammonia resisting gray enamel, which is then applied and baked on permanently (Page 17).

WEIGHT Average weight per stall, 70 lbs.
Weight of Extra Stall Partitions, 15 lbs.

MANGER PATTERN Furnished free upon request; made of hardwood; to be used as pattern for shaping concrete mangers.

ADDITIONAL EXCLUSIVE FEATURES

STAR Steel Stall as illustrated on the opposite page can be equipped with the following additional features:

STAR Rust Shields. (See page 15.)

STAR Automatic Sure Stop. (See page 14.)

The following may be added at any time:

STAR Alignment Device. (See page 8.)

STAR Manger Partition. (See page 44.)

STAR Water Bowls. (See pages 48-53.)

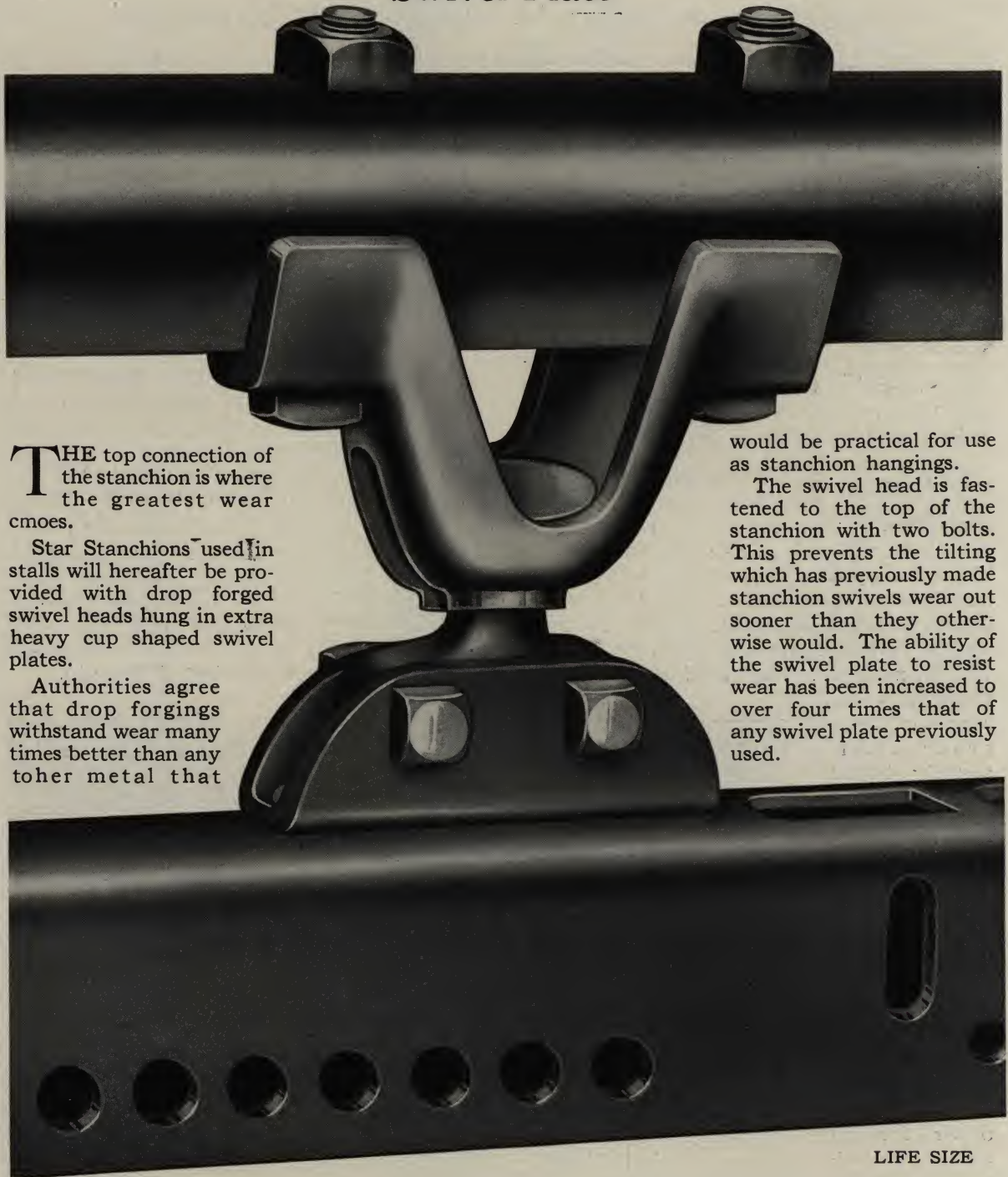
STAR Name Plates. (See page 46.)

STAR Stalls always shipped completely assembled and ready to install (Page 5).



STAR Equipped Barn of Judge Healy, Mohawk Trail, Near Shelbourne Falls, Mass.

Star Drop Forged Swivel Head and Extra Heavy Swivel Plate



THE top connection of the stanchion is where the greatest wear comes.

Star Stanchions used in stalls will hereafter be provided with drop forged swivel heads hung in extra heavy cup shaped swivel plates.

Authorities agree that drop forgings withstand wear many times better than any other metal that

would be practical for use as stanchion hangings.

The swivel head is fastened to the top of the stanchion with two bolts. This prevents the tilting which has previously made stanchion swivels wear out sooner than they otherwise would. The ability of the swivel plate to resist wear has been increased to over four times that of any swivel plate previously used.

LIFE SIZE

The under side of the pipe which forms the arch or frame is pressed into a "V" shape so that the heavy swivel plate gets a long wide bearing, fits perfectly and cannot twist or work loose on the pipe.

No. 486 Giant Star Adjustable Steel Stanchion



Fig. 537

Cross section of Giant Star Stanchion, showing wood lining. This lining is made of thoroughly kiln-dried hard maple, forced in under pressure, and then secured by long screws. It cannot be loosened.

HERE is a stanchion that embodies every good feature of construction and operation that a good stanchion should have.

It is distinctively neat in design and construction and easy to operate.

It is easily and quickly adjustable in neck width to fit the largest bull or the smallest calf. And the adjustment is firm and secure.

The wood lining, completely filling the U-bar, adds about one-third to the strength of the upright, making it stronger and harder to bend by actual test than $1\frac{1}{4}$ inch pipe.

It is equipped with a one-hand double lock so you don't have to set down your pail of milk to turn the cow loose.

And, automatically, it drops into position to receive the cow on her return to the stall.

The sliding guide of the Giant Star Stanchion removes all strain on the hinge and insures perfect operation of the lock at all times.

The wood lining is wedged into the U-bar—secured as tightly as if it were part of the metal—then additionally anchored with inch and a quarter screws. This wood lining is made of seasoned hard maple, thoroughly kiln-dried, and is the kind of wood lining that the cattle cannot crowd off.

The Giant Star costs but little more and offers so *much* more satisfaction and wear that it is by far the *cheapest in the long run*.

Finished in gray enamel, thoroughly baked on.

No. 486 Giant Star Stanchion hung with chains top and bottom, weight each, 27 pounds. Hung with swivel at top and double chain hanging at bottom, weight each, 29 pounds.

No. 875 Giant Bull Stanchion adjusts to 12 in. width, with swivel top and bottom, weight each, 29 pounds.

No. 1317 Star Round-Bottom, Wood-Lined Adjustable Steel Stanchion

WITH Star Knobby Latch

THE Star Knobby Latch on the No. 1317 stanchion is a cow-proof latch that is easy to operate.

The Knobby Latch works on an entirely new and different principle. It is hinged below the center of the stanchion guide or draw bar so that a pull on the stanchion upright draws the latch down and makes it hold tighter than ever.

This latch is easily released by lifting the ball knob—no matter how hard the cow may be pulling on the stanchion.

The position of the hand in opening the stanchion is such that it cannot be pinched or hurt by striking the stall post, even though the stanchion flies open suddenly.

The Knobby Latch is a one-hand latch so the cow can be released after milking without setting down the pail.

The fork at the upper end of the swinging arm of the stanchion engages the stall post, prevents the stanchion from swinging and holds it in position to receive the cow on her return to the stall.

The sliding guide or draw bar prevents any strain on the hinge and insures the operation of the lock so the stanchion can be closed by simply slamming it shut.

This stanchion is easily adjusted in neck width to accommodate calf, a cow, or a bull.

It is strong enough to hold an ordinary bull because the uprights are made of $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ in. steel U-bars completely filled with hard maple lining that is thoroughly kiln dried. In addition to being wedged into the throat of the U-bar this lining is held in place by four drive screws. It cannot possibly be crowded off.

The trim neatness of this stanchion will appeal to those who prefer the round bottom design.

Another distinctive feature of this stanchion is the double bolt fastening at the top, which when used with a swivel keeps the swivel perpendicular, prevents it from twisting and turning so that it cannot possibly wear the swivel plate unevenly.

No. 1317 Star Round-Bottom Stanchion with Knobby Latch hung with 5-link chains at top and bottom, weight 26 lbs. Hung with swivel at top and double chain at bottom at slight additional cost, weight each, 28 lbs.

This Stanchion is interchangeable with the Stanchions shown in any Star Unit Stalls.

Fig. 1317

No. 1285-W Star Wood-Lined Adjustable Steel Stanchion

WITH
Star Knobby Latch

THE No. 1285-W Stanchion is fitted with the Star Knobby Latch. This latch is pivoted below the level of the draw bar. A pull on the stanchion upright draws the latch down. The harder the cow pulls the tighter the latch holds.

But the unique design of the latch is such that it can easily be opened by lifting the ball knob on top of the latch.

When the stanchion is opened while the cow is straining to get loose, the hand which opens the latch cannot be pinched or injured on the stall post no matter how violently the stanchion flies open because the hand operating the latch is above the stanchion and not between the stanchion upright and the stall post.

A heavy malleable guide or draw bar relieves the hinge of all strain, insures the perfect operation of the lock and makes it possible to close the stanchion by simply slamming it shut.

A fork device on the upper end of the swinging arm or movable upright fits around the stall post when the stanchion is open, prevents it from swinging and holds it in proper position to receive the cow when she returns to the stall.

The uprights of this stanchion are made of $1\frac{1}{4} \times 3\frac{3}{16}$ in. steel U-bars completely filled with smooth hard maple lining. The lining is wedged tightly into the throat of the U-bar and is further held in place by four heavy drive screws so that it cannot possibly be removed or crowded off by the straining of the cow.

The double bolted top and bottom brackets furnished with this stanchion are especially desirable for swivel hung stanchions. It holds the swivel firmly, prevents it from wobbling or wearing and cutting the swivel plate unevenly.

The neck width of the stanchion can easily be adjusted from 5 to $8\frac{1}{2}$ inches.

Finished in gray enamel baked on.

No. 1285-W Wood-Lined Knobby Latch Stanchion furnished with 5-link chain above and below, weight each, 26 pounds.

Same stanchion can be furnished with swivel and double chain at slight additional cost, weight each, 27 pounds.

No. 1285 All-Steel Knobby Latch Stanchion same as 1285-W with U-bars reversed and without wood lining. Weight each, chain hung, 24 pounds.

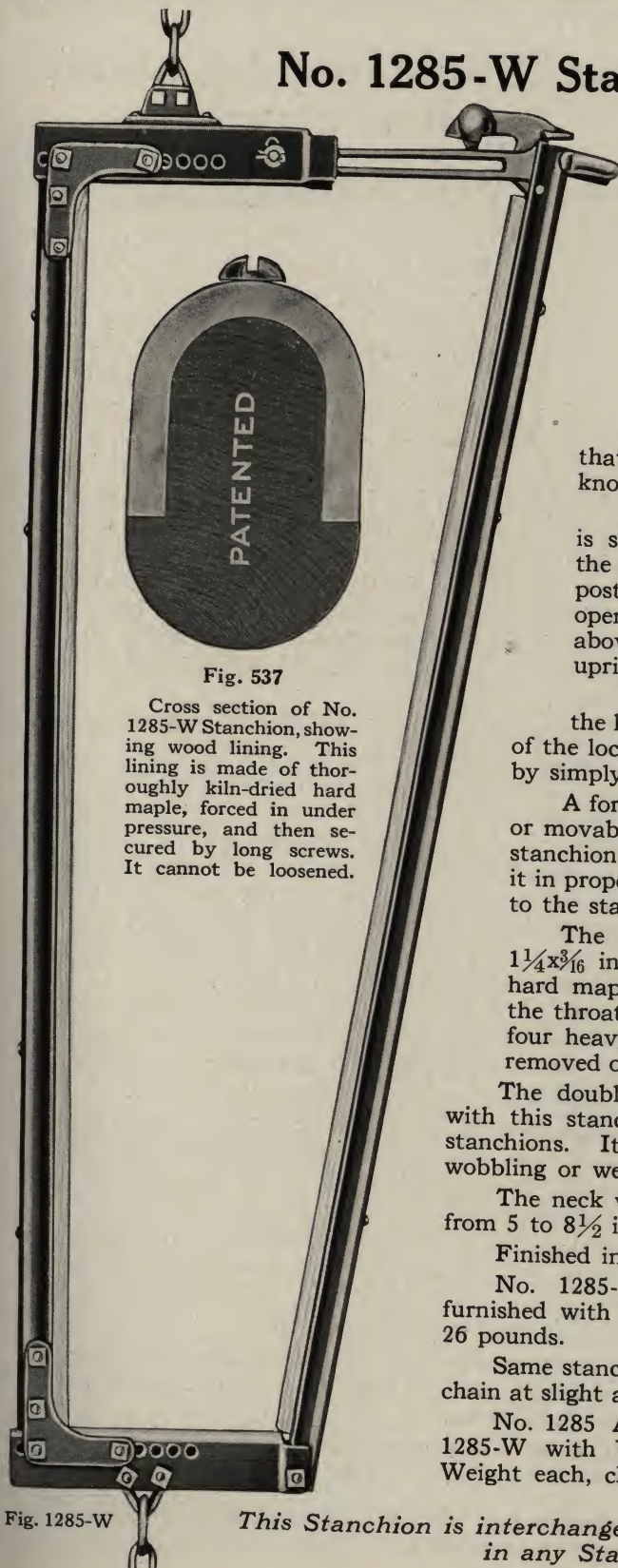


Fig. 537

Cross section of No. 1285-W Stanchion, showing wood lining. This lining is made of thoroughly kiln-dried hard maple, forced in under pressure, and then secured by long screws. It cannot be loosened.

Fig. 1285-W

This Stanchion is interchangeable with the Stanchions shown in any Star Unit Stalls.

No. 1211-W Star Wood-Lined Adjustable Steel Stanchion

WITH
Star Knobby Latch

This stanchion is made of $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ in. high carbon steel U-bars. A heavier, stiffer U-bar than generally used in stanchions of this type.

THE No. 1211-W Star Adjustable Steel Stanchion is made of $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ in. high carbon steel U-bar—a much heavier, stiffer U-bar than is generally used in stanchions of this type.

It can be adjusted from 6 in. to 8 in. in neck width, which will take care of the varying neck thicknesses of cows.

A distinctive feature of the stanchion is the Star Knobby Latch. This latch is not only positive and cow-proof but is very easy to operate with one hand.

Because of the unique principle of the design of this latch—the latch being hinged below the center of the guide or draw bar—a pull on the stanchion upright draws the latch down and makes it hold tighter than ever.

No matter how hard the cow may be pulling on the stanchion and struggling to get free, the latch is easily released by lifting the ball knob on the top of the stanchion.

No matter how hard the cow may be struggling to get loose there is no danger of injuring the hand which operates the stanchion because the hand is on top of the stanchion and cannot strike the stall post or be caught between the stall post and the swinging upright of the stanchion as it flies open when released.

The guide or draw bar which is fastened to the upper end of the movable section takes all strain off the hinge and guides the lock into place so that the lock works positively when the stanchion is closed by slamming it shut.

A fork or yoke casting on the upper end of the movable upright drops over the stall post when the stanchion is open. This prevents the stanchion from swinging and holds it in position to receive the cow as she returns to the stall.

No. 1211-W Stanchion is furnished with 5-link single chain at top and bottom unless otherwise specified, weight each, 22 pounds.

Finished in gray enamel baked on.

When so specified it can also be furnished with a swivel at top and double chain at bottom at slight additional cost, weight each, 24 pounds.

No. 1211 Stanchion same as above without wood lining, weight each, 20 pounds.

Fig. 1211-W

This Stanchion is interchangeable with the Stanchions shown in any Star Unit Stalls.

No. 452 Star Adjustable Wood Stanchion

WITH Star Knobby Latch

THE Star Adjustable Wood Stanchion offers all the advantages of any wood stanchion and in addition has the adjustable feature.

The uprights are made of seasoned hardwood, and are very strong and durable. The cross-pieces are of all pressed steel, securely bolted and held in place by steel braces.

The stanchion is adjustable in neck width from 5 to 8 inches, and can thus be made to accommodate very young heifers or full sized cows. This adjustable feature means economy. It won't be necessary to buy stanchions of special sizes for special sized animals. Your stanchions will fit your herd *always*—no matter how it changes.

The latch is a vital part of the stanchion. The Star Adjustable Wood Stanchion locks automatically when slammed shut. The latch is made of a single piece of malleable iron, which slides in between two pressed steel side plates, connecting the upper part of the stanchion, so that the movable upright is always guided when open.

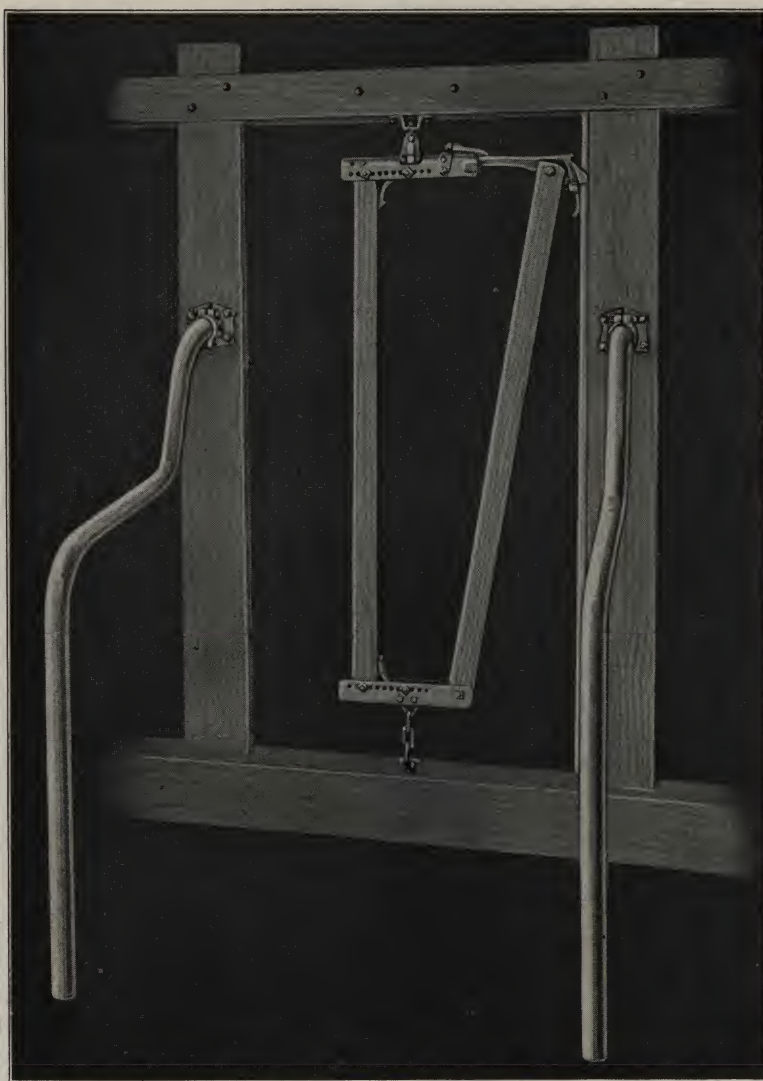
The stanchion is also provided with a fork or yoke casting on the latch which holds the stanchion in proper position when open.

The stanchion is furnished with chain hangings, or if desired, with swivels. Be sure to specify which style of hanging is wanted when ordering.

No. 452 Star Adjustable Wood Stanchion, weight 16 lbs.

This Stanchion is interchangeable with the Stanchions shown in any Star Unit Stalls.

Uprights made of $1\frac{1}{4}$ in. x $2\frac{1}{2}$ in. seasoned hardwood—strong and durable; cross-pieces made of high grade steel, securely bolted and held in place by heavy steel braces.



How to Hang Star Stanchions in Wood Frames

THE accompanying illustration shows the Giant stanchion hung in a wood frame and used in connection with Star stall partitions.

Where lumber and labor are cheap this offers an economical way to give the cow protection and comfort.

Hung as shown here the stanchion permits the cow to turn her head to look or lick behind. Star partitions installed as shown give her an individual space and protect her from being injured by the crowding or trampling of her neighbors.

The curb should be 6 inches high and about 6 inches wide. Where a concrete curb is used a 2 x 6 can be laid along the top of the curb and bolted to it and the feet of the 2 x 6 upright pieces of the frame toenailed and cleated to the 2 x 6 which runs along the top of the curb.

Two 2 x 6's form the top rail. If the stanchion is chain hung at top and bottom the top can be held by running a bolt through these 2 x 6's and through the last link of the chain.

Stall Partitions and Fittings

No. 618 Star Stall Partition for cement floor and wood upright, weight each, 16 pounds.

No. 619 Star Stall Partition for wood floor and wood upright, weight each, 17 pounds.

Star Split Flange

No. 719

Star Split Flanges can be quickly attached to stall partitions intended for cement floor, thereby adjusting them for attaching to wood floor.

Weight each, 1¼ lbs.

Finish
Gray Enamel, Baked On

Fig. 618

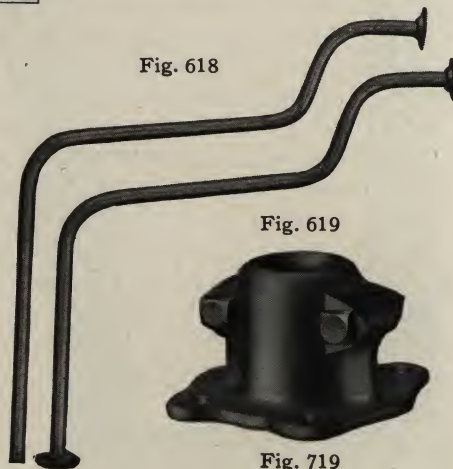


Fig. 619

Fig. 719

Stanchion Fastenings

ALL Star Stanchions are regularly furnished hung either single chain or swivel top and bottom. Star ball and chain anchor is shown at the left. A four-link chain with a weight attached to the lower end slides up and down in a 7" piece of $1\frac{1}{4}$ " pipe which is pinched together at the bottom and threaded at the top where the cap is screwed on. The weight drops down and takes up the slack in the chain when the stanchion hangs in a central position. It holds the end of the chain fast when the stanchion is moved in any direction. This anchor prevents kinking and breaking the chain. It reduces wear. It permits the stanchion to swivel all the way around so that the stanchion may be opened either to the right or to the left. Weight each, 2 lbs.

No. 627 should be specified for wood top and also for wood curb. Weight each with lag screws $\frac{1}{4}$ lb.

Note that $2\frac{1}{2} \times \frac{3}{8}$ -inch lags are furnished for attaching No. 627 malleable to wood.

No. 628 Bottom Fastening, with anchor weighs $1\frac{1}{4}$ lbs.

Where No. 628 with malleable anchor is used to fasten the stanchion to a concrete curb the No. 627 fastening is used to hold the top of the stanchion. Weight per pair (627 and 628) $1\frac{1}{2}$ lbs.

When so specified, any of the various styles of stanchions will be furnished hung swivel top and double chain bottom, exactly as illustrated below.

This Double Chain Hanging is especially desirable for the reason that it permits the stanchion to hang as close to the curb as possible and because it gives the necessary freedom backward and forward without any tendency toward side motion.

No. 629 Double leable curb fasten-machine bolts, and inch lags, illustrated. Specify No. 629-W per set, $1\frac{1}{2}$ lbs.

Chain Hangings with mal-ings, malleable anchor, top swivels with $2\frac{1}{2} \times \frac{3}{8}$ ed, weight per set, 3 lbs. for wood curb. Weight



Fig. 1247



Fig. 627



Fig. 628

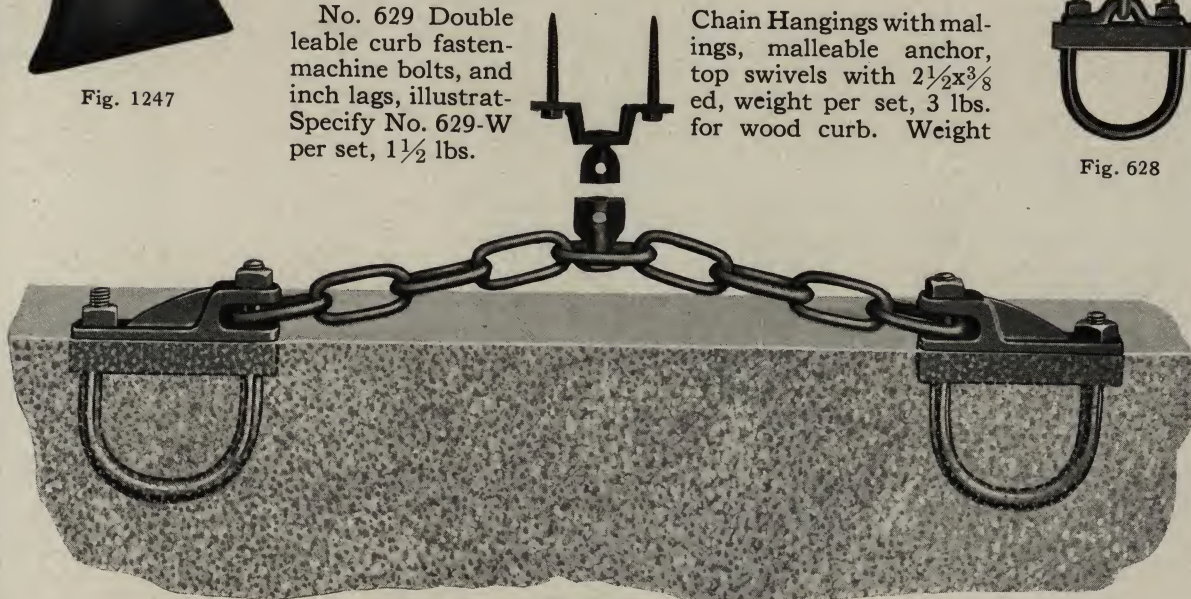
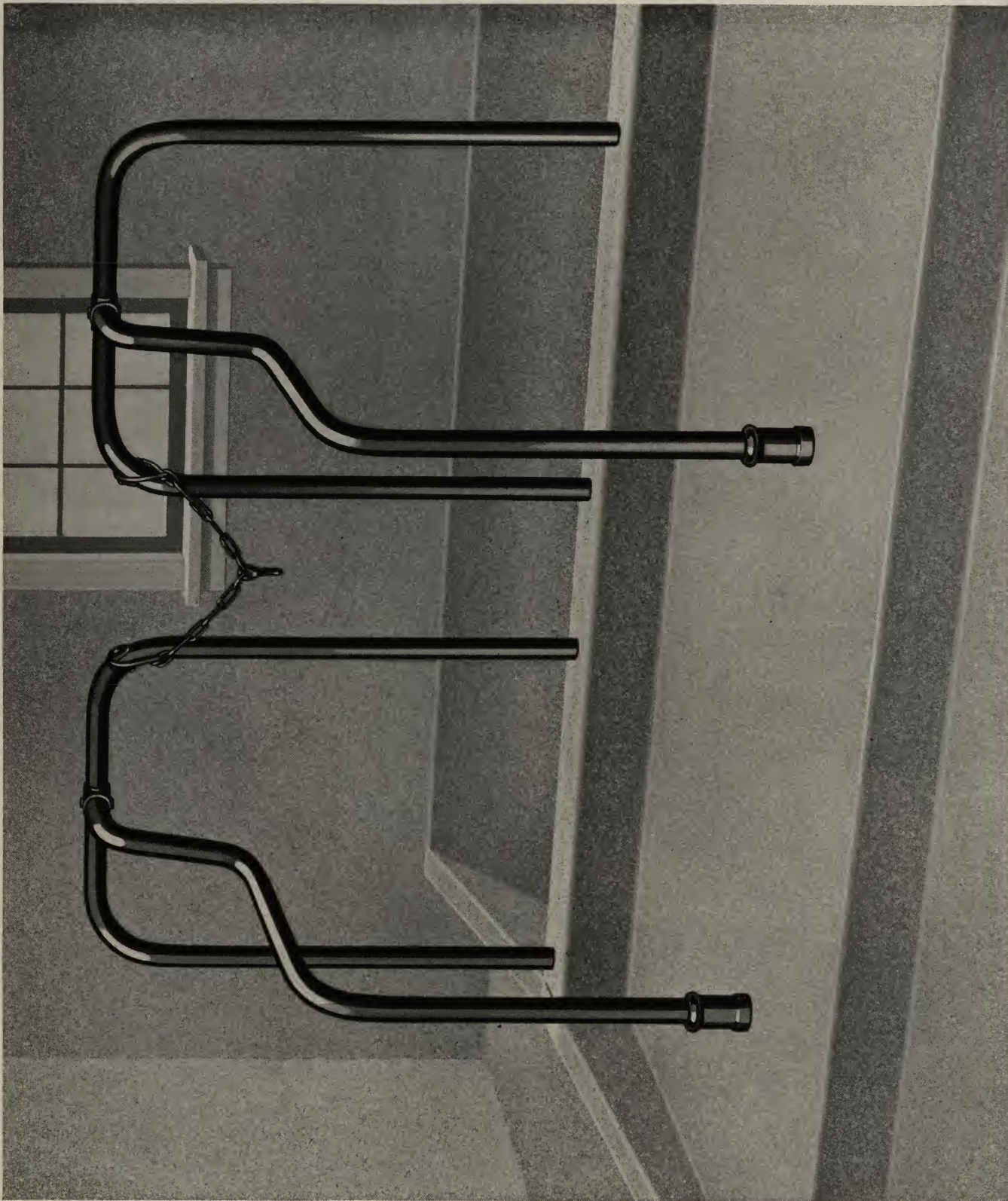


Fig. 629C



No. 873 STAP Chain Tie Stall Equipped With Chain Rings, Hanger Sides and Position Rust Shield

No. 873 Star Chain Tie Stall

Equipped With Chain, Rings, Halter Snap and Partition Rust Shield

SPECIFICATIONS

ARCH STAR "Unit System," made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Bent cold. Thickness of pipe wall .14 in. Center post fits into clamp casting which also holds front end of partition. It divides the space between the legs of the arch so a cow will put her head between the arches instead of through one of them. Regularly furnished to allow each cow 3 ft. 6 in. Can be furnished in proper width for any practical spacing. Height, 40 inches.

PARTITIONS STAR Triple Bend Stall Partitions; made of high grade pipe $1\frac{5}{8}$ in. outside diameter—new and tested. Thickness of pipe wall, .14 in. Fitted with Star Rust Shield.

RUST SHIELD Malleable Shield filled with rust-proof preservative fitted around the partition at the floor line. Prevents partitions rusting off at the floor.

FINISH After all machine work has been done on the material entering into the construction of this stall, the mill scale, grease, or other foreign matter is thoroughly removed by a special cleaning process. It provides a thoroughly clean surface for the rust and ammonia-resisting gray enamel which is then applied and baked on permanently.

WEIGHT Average weight per stall 47 lbs.
Weight of extra partition with Rust Shield, 17 lbs.

MANGER PATTERN Furnished free upon request; made of hardwood; to be used as pattern for shaping concrete mangers.

CURB CLAMPS May be used with each of the three posts of the Chain Tie Stall instead of running the posts down into concrete. Where the Curb Clamps are used it

is possible to do all of the concrete work in the barn before any of the stalls are set, saving time and expense and insuring a smooth job of concrete.

STAR WATER BOWLS When used in connection with Chain Tie Stalls, the water bowls are supported by clamps attached to the center posts.

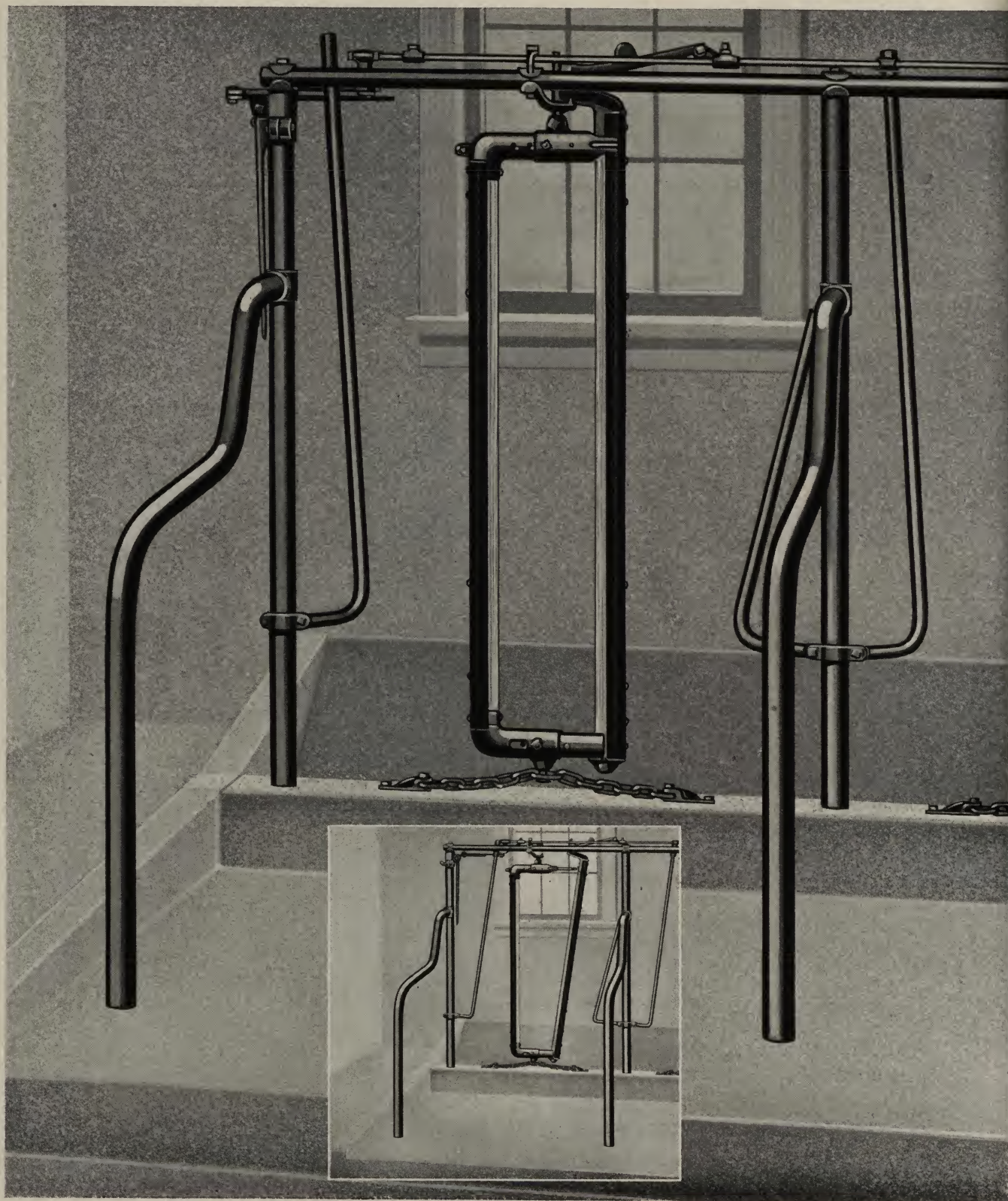
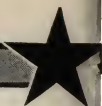
SUPPORTING POSTS Where supporting posts are set in the stall row, they take the place of the center post in the arch. The arch being made in two pieces—the top ends of both connected with the supporting post by a neat, strong clamp casting which also holds the front end of the stall partition.

Supporting posts can be set at the rear of the platform in line with the stall partition if desired. Also, if any peculiar arrangement makes it necessary, they may be set back of the curb where they intersect the partition.

No. 873 Chain Tie Stall, as illustrated, with partition rust shield, weight each, 47 lbs.

No. 872 Chain Tie Stall, same as No. 873, without partition rust shield, weight each, 43 lbs.





No. 1302 STAR Lever Stall Equipped With Giant STAR Lever Stanchion, Sure Stops and Double Chain Bottom Fastening

No. 1302 Star Lever Stall

Equipped with Giant Star Lever Stanchion, Sure Stops and Double Chain Bottom Fastening

Stanchions opened and closed all at once or one at a time

TOP RAIL Made of two parallel U bars, size $1\frac{1}{4}$ by $\frac{7}{8}$ in., facing each other and held together by malleable clamps placed at the top of every stall post and at every stanchion hanging.

UPRIGHTS AND PARTITIONS The Stall uprights or posts and the STAR Triple Bend Stall Partitions are made of high grade pipe $1\frac{5}{8}$ -in. O.D.—new and tested. Thickness of pipe wall .14 in. Each partition may be fitted with STAR Rust Shield—see page 15.

STANCHION Giant STAR Stanchion No. 486; patented; adjustable in neck space from 5 in. to 9 in. (Page 11): one-hand, cow-proof lock; malleable guide removes strain from hinge; swivel hanging at top and double chain hanging at bottom. Uprights are high carbon steel U-bars $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in., completely filled with kiln-dried hard maple linings driven in and secured by $1\frac{1}{4}$ in. drive screws (Page 12).

LEVER Lever is of heavy malleable iron hinged to a collar that fits loosely around the top of the stall post at the end of the row. It is operated horizontally in a half circle—either in front of or behind the stall row. (May be changed any time.) It hangs down out of the way along the post when not being used.

LEVER RODS Two $\frac{3}{8}$ -in. steel rods, lying parallel along the top rail are connected with the lever and with the latch bars of all the stanchions in the series and with all the movable sure stops in the series.

A guide wheel working within the top rail at the lever end of the rods keeps the rods from being bent or pushed into position where they might rub, wear or pull hard. Heavy malleable ring guides fastened above the top rail keep lever rods in line.

SURE STOPS Sure stops made of $\frac{3}{4}$ -in. pipe. Stationary sure stop parallel with open arm of stanchion. Movable sure stop on other side of stanchion automatically falls into place when the stanchion is opened and is closed with the stanchion by the operation of the lever.

LOCK-OUT DEVICE Provided with each stanchion to instantly disconnect stanchion from lever or put it back on to the lever again.

WEIGHT Per stall 90 lbs.

ADDITIONAL EXCLUSIVE FEATURES:

STAR Lever Stalls may be equipped with the following exclusive features:

STAR Rust Shields. (See page 15.)

Bottom Bar and Curb Clamps. (See page 13.)

The following features may be added any time.

STAR Alignment Device. (See page 38.)

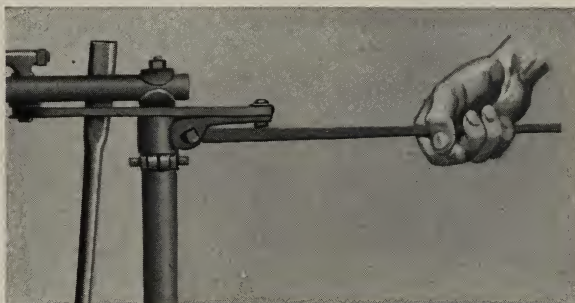
STAR Manger Partitions. (See page 44.)

STAR Water Bowls. (See pages 47 to 53.)



"These Stanchions in My Barn Work Easier Than Any I Ever Saw"—Herman Rebe, Watertown, Wisc.

Features of Star Lever Stalls



The STAR Lever Swings Horizontally.

ALL the features which have proven so valuable in the everyday use of STAR Unit Stalls for so many years have been retained or duplicated in STAR Lever Stalls. In addition to this, with the STAR Lever Stalls a whole row of stanchions can be opened or closed at one throw of the lever.

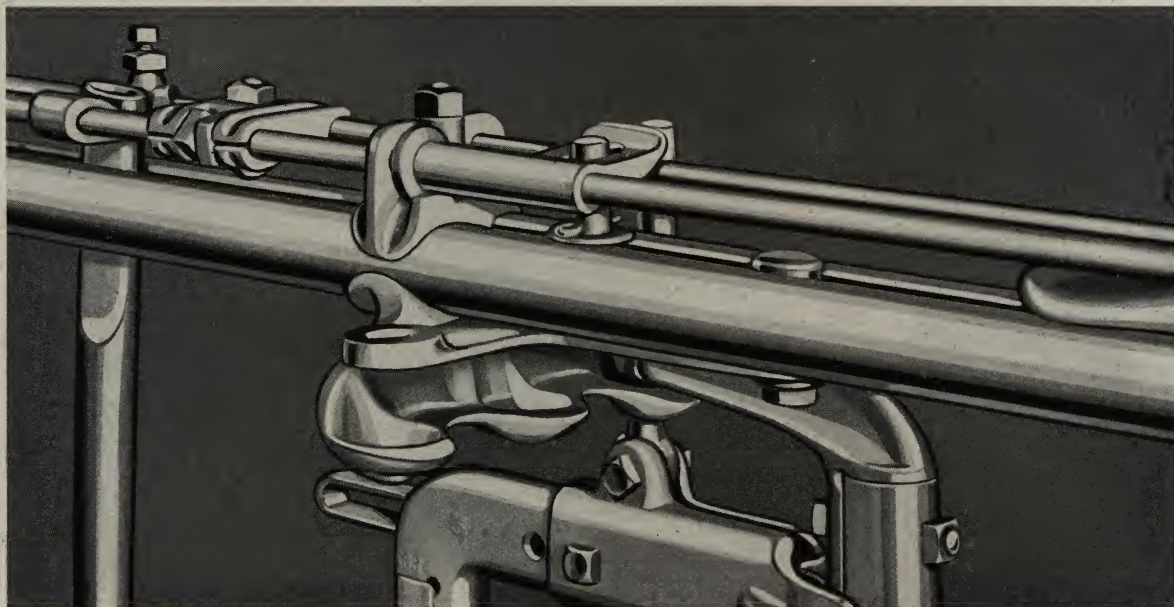
The lever on the STAR stalls works in a horizontal half circle in front of the stall row or in back of it, as desired. It can be changed from front to back at any time, just by removing two cotter pins which hold the malleable link connecting the lever with the lever

rods. Being hinged, the lever hangs down out of the way when not in use and automatically drops over a peg that locks all the stanchions shut.

The movable arm of each stanchion falls open automatically when the lever is thrown. Any stanchion may be opened with one hand without disturbing the others by simply lifting the latch bar which is hinged to both the parallel lever rods and slides back and forth in the top rail.

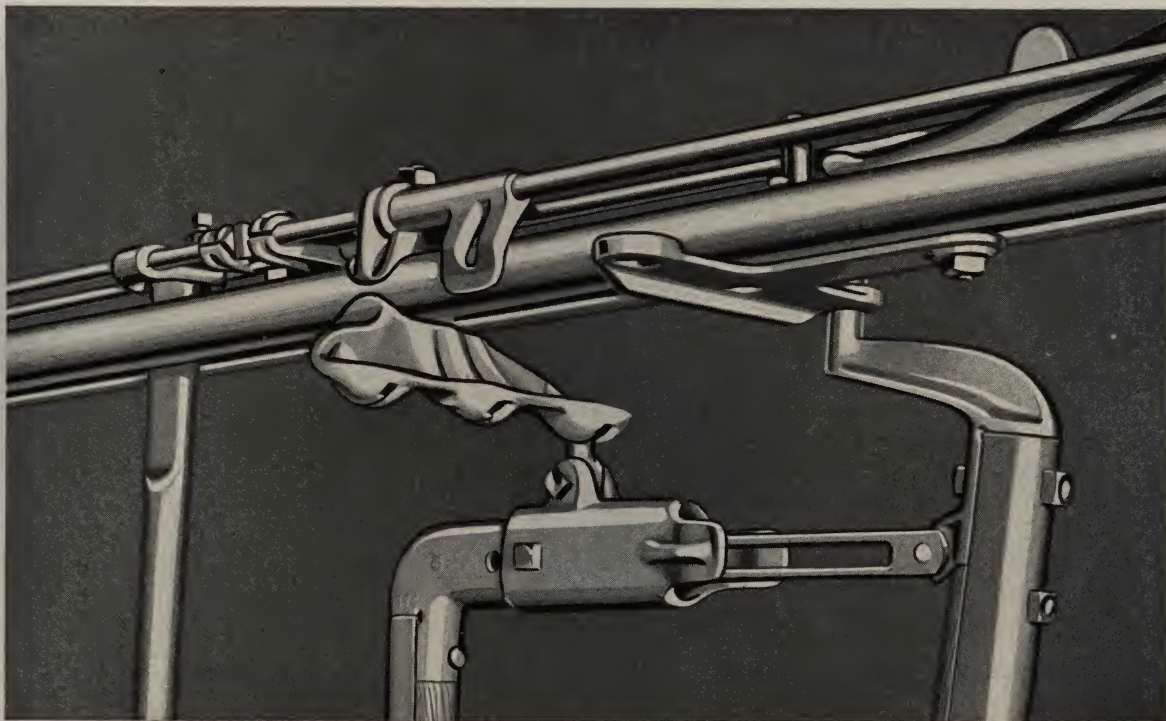
The stanchions opened one at a time, may be closed the same way or they may be closed with the other stanchions when the lever is thrown again.

Any stanchion may be completely locked out of the lever system at any time and kept closed while all the others are opened. This is accomplished by a malleable lock-out device hinged at right angles to one of the lever rods. To open a stanchion which has been locked out of the series or to put it back on to the lever, you merely lift the lock-out device out of the way.



Close-up showing STAR Adjuster or Alignment Device for lever stalls with stanchion adjusted forward and held shut by the lock-out device

Features of Star Lever Stalls



Close-up Showing STAR Adjuster or Alignment Device for Lever Stalls with Stanchion Open and Adjusted Forward.

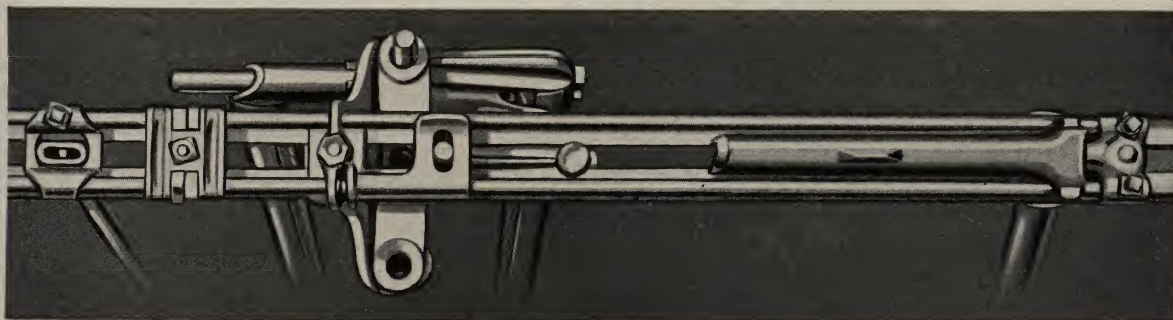
To prevent a cow from getting her head in the wrong place there is a short stationary sure stop which runs parallel to the open arm of the stanchion and a long movable sure stop which automatically falls into place on the other side when the stanchion is opened.

The movable sure stop is pulled back out of the way by the operation of the lever at the same time that it closes the stanchions.

Both of these sure stops prevent the cow from working feed back into the stall and wasting it.

The Adjuster or Alignment Device permits the stanchion to be adjusted forward for long cows or backward to bring short cows into line at the gutter.

The use of the Adjuster does not interfere with the opening and closing of the stanchions one at a time or by use of the lever.



Top View Showing STAR Adjuster for Lever Stanchions, Lever Rods, Latch Bar and Lock-out Device.

A Clear Floor Sketch
Saves Explanations

It is Easy to Order Star Stalls

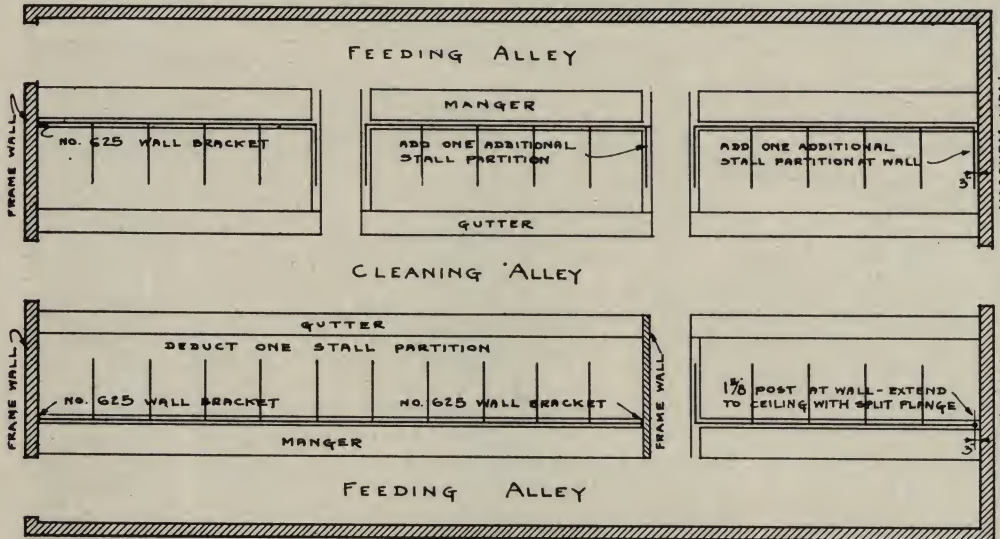
When Ordering Lever Stalls
Show Location of Levers

YOUR ORDER SHOULD GIVE THE FOLLOWING NUMBERED INFORMATION:

1. NUMBER OF STALLS OF EACH WIDTH.....3'0";.....3'3";.....3'4";.....3'6";.....Irregular Widths.
2. THE CATALOG FIGURE NUMBER TO INDICATE KIND OF STALL WANTED.
3. The exclusive STAR features to be added or omitted.
4. The kind of stanchion wanted (if different than shown with stall in catalog illustration).
5. THE NUMBER OF NO. 625 WOOD WALL BRACKETS WANTED (see diagram below.)
6. THE NUMBER OF END PARTITIONS TO BE ADDED OR DEDUCTED (see diagram below).

NOTE

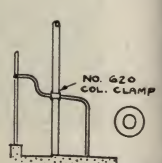
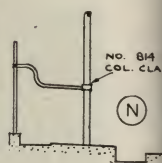
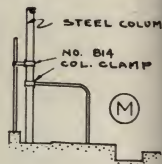
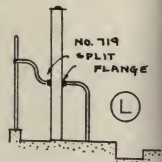
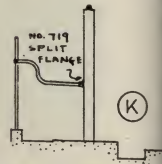
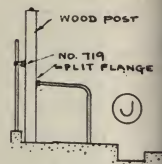
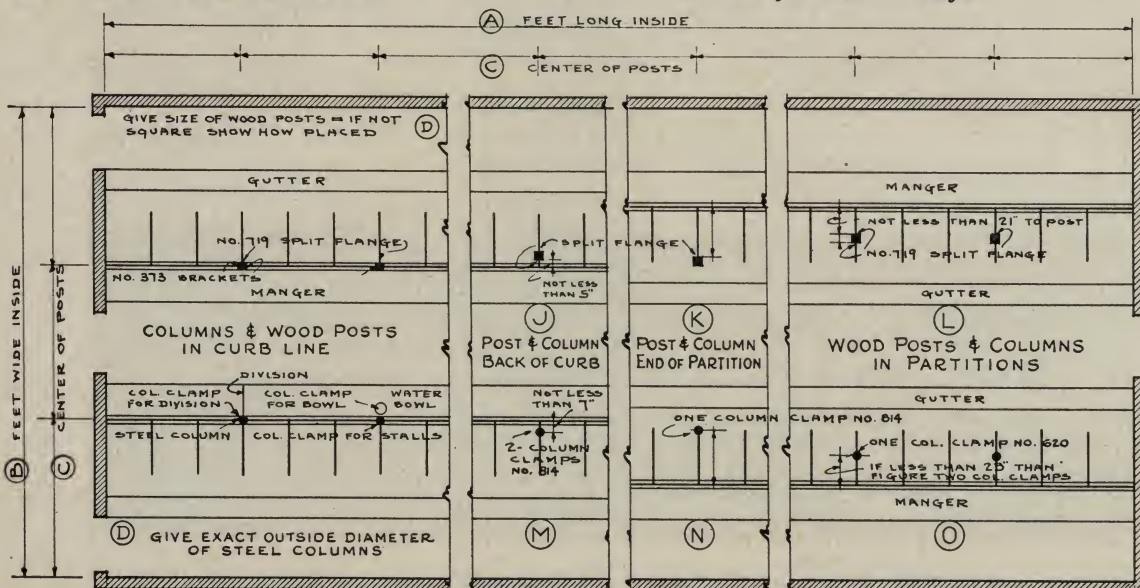
Where stall row ends next to steel bull pen, calf pen or cow pen which has already been installed, add one extra partition. This partition must be five inches away from center of pen panel. Where stalls and pens are installed at the same time, end of row can be fastened to pen for same charge as No. 625 Wall Bracket.



7. THE NUMBER OF POST BRACKETS OR COLUMN CLAMPS WANTED. (See diagram below.)

Note:—Where posts come in contact with stalls order must be accompanied by sketch showing:

- A. Exact length of barn inside.
- B. Exact width of barn inside.
- C. Exact location of posts (show measurements from center to center lengthwise and crosswise. Be sure that the sum of these measurements equals the total inside dimensions).
- D. Exact size of posts. (Outside diameter. If not square nor round, show which way they set.)
- E. Whether posts are made of wood or steel.
- F. Which way they can be moved.
- G. Whether stalls face in or out.
- H. Where you want stalls located.
- I. Where you want the alleys.



CHECK ORDER CAREFULLY TO BE SURE THAT ALL ABOVE INFORMATION IS GIVEN CLEARLY

Space Required By Stalls of Different Sizes

Measurements from Center to Center of Partitions

No. of Cows	3 ft.	3 ft. 3 in.	3 ft. 4 in.	3 ft. 6 in.
1	3 ft. 0 in.	3 ft. 3 in.	3 ft. 4 in.	3 ft. 6 in.
2	6 ft. 0 in.	6 ft. 6 in.	6 ft. 8 in.	7 ft. 0 in.
3	9 ft. 0 in.	9 ft. 9 in.	10 ft. 0 in.	10 ft. 6 in.
4	12 ft. 0 in.	13 ft. 0 in.	13 ft. 4 in.	14 ft. 0 in.
5	15 ft. 0 in.	16 ft. 3 in.	16 ft. 8 in.	17 ft. 6 in.
6	18 ft. 0 in.	19 ft. 6 in.	20 ft. 0 in.	21 ft. 0 in.
7	21 ft. 0 in.	22 ft. 9 in.	23 ft. 4 in.	24 ft. 6 in.
8	24 ft. 0 in.	26 ft. 0 in.	26 ft. 8 in.	28 ft. 0 in.
9	27 ft. 0 in.	29 ft. 3 in.	30 ft. 0 in.	31 ft. 6 in.
10	30 ft. 0 in.	32 ft. 6 in.	33 ft. 4 in.	35 ft. 0 in.
11	33 ft. 0 in.	35 ft. 9 in.	36 ft. 8 in.	38 ft. 6 in.
12	36 ft. 0 in.	39 ft. 0 in.	40 ft. 0 in.	42 ft. 0 in.
13	39 ft. 0 in.	42 ft. 3 in.	43 ft. 4 in.	45 ft. 6 in.
14	42 ft. 0 in.	45 ft. 6 in.	46 ft. 8 in.	49 ft. 0 in.
15	45 ft. 0 in.	48 ft. 9 in.	50 ft. 0 in.	52 ft. 6 in.
16	48 ft. 0 in.	52 ft. 0 in.	53 ft. 4 in.	56 ft. 0 in.
17	51 ft. 0 in.	55 ft. 3 in.	56 ft. 8 in.	59 ft. 6 in.
18	54 ft. 0 in.	58 ft. 6 in.	60 ft. 0 in.	63 ft. 0 in.
19	57 ft. 0 in.	61 ft. 9 in.	63 ft. 4 in.	66 ft. 6 in.
20	60 ft. 0 in.	65 ft. 0 in.	66 ft. 8 in.	70 ft. 0 in.

Star Stalls Fit Anywhere

IN Figure 508 are shown three regular sizes of arms for Star Unit Stalls. These arms used with regular arches will make either three foot, three foot three inch or three foot six inch stalls. Similar double bolted arms to make three foot four inch stalls are also furnished regularly.

The illustration at the right shows the manner of attaching stalls to wooden posts located in or at the end of the stall row. When necessary to attach stalls to wooden posts, specify exact size of posts, distance apart on center, and whether these posts are located flush with or back of manger edge of cement curb.

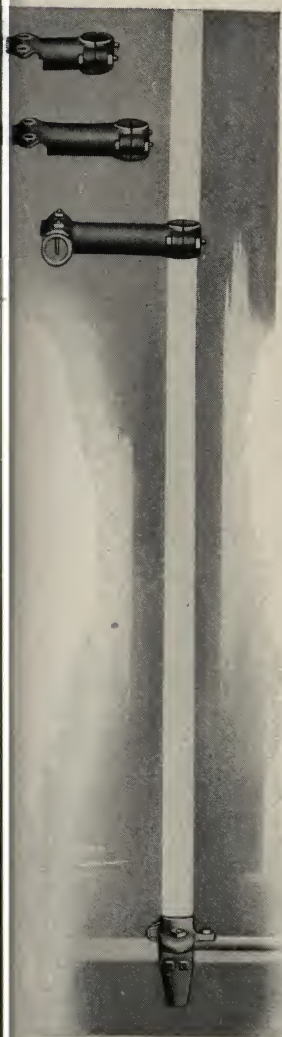


Fig. 508

No. 508 Stall Arms for STAR Unit Stalls



Fig. 623

Special Arm for Making Unit Stalls Any Width Desired

The above illustration shows the special arm by which Star Unit Stalls can be made any desired width. The two malleable parts fit perfectly into the ends of a short piece of one and five-eighths inch O. D. pipe and are connected by a five-eighths inch full thread bolt. The piece of pipe can be cut to the required length for any width stall.

When ordering special arms, specify exact distance from center of arch upright to center of stall partition.

When ordering special arms for Unit Stalls between steel columns, specify exact distance from center of arch to center of column to which arm is to be attached, also state the outside diameter of column.



Fig. 625

No. 625 Bracket for Wood Wall or Post

Malleable brackets fastened with lag screws as shown above are used to attach Star Stalls to wooden posts located in stall rows or to wooden partitions or wall at ends of rows. These are further illustrated in the picture at the left.

Fitting Star Stalls to Wood Posts and Steel Columns

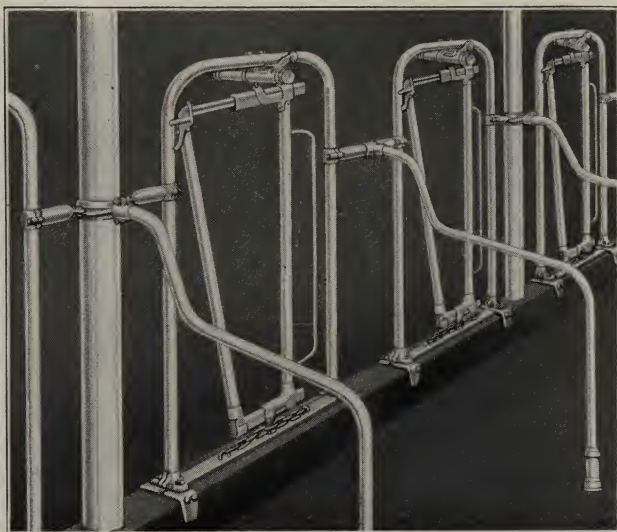


Fig 1266

Column clamp for any size of steel column in curb line is provided with a flat bracket cast onto the clamp to which stall arm is fastened with two bolts. Average weight, 4 pounds.

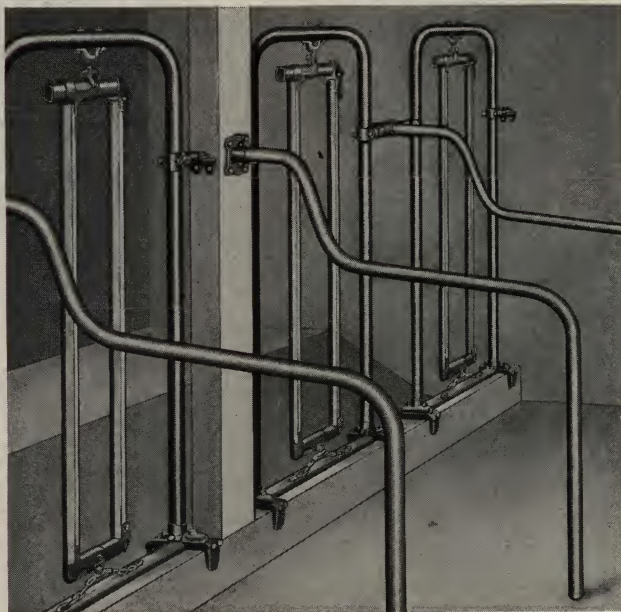


Fig. 1260

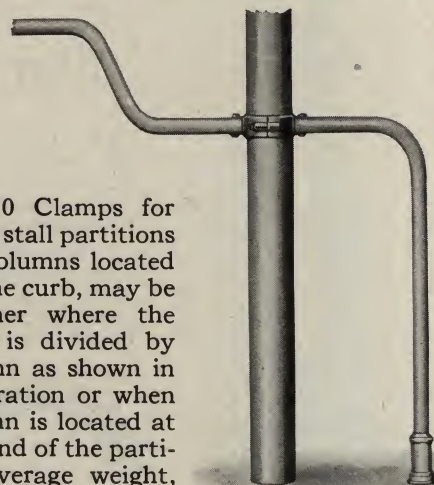
STAR Unit Stalls attached to wall at end of row and to wood post in stall row.

One big advantage of the Star Stalls is that they will conform to any arrangement of posts or steel columns which support the mow floor.

Steel Columns in Curb Line

Where the steel columns are placed in the curb line, as shown in figure No. 1266, between two adjacent stalls, they take up absolutely no room that could be otherwise used. The stalls which stand next to the steel columns are provided with arms that are fastened by two bolts to flat brackets which are cast onto the heavy malleable iron clamp. The column clamp also clamps firmly around the stall partition where it ends at the post.

No. 620 Partition Clamps



No. 620 Clamps for attaching stall partitions to steel columns located back of the curb, may be used either where the partition is divided by the column as shown in the illustration or when the column is located at the rear end of the partition. Average weight, $2\frac{1}{2}$ pounds.

Wood Posts in Curb Line

Figure 1260 shows method of fastening stalls and partitions to wood posts which occur in the curb line. No. 625 bracket is fastened to the side of the post or to the wall at the end of the row. To this, the arm of the adjacent stall is held fast by two bolts. The end of the partition which goes up against the post is held in place with No. 719 split flange.

No. 719 split flange weighs $1\frac{1}{4}$ pounds. No. 625 wall bracket weighs $\frac{1}{2}$ pound.

No. 626 Star All-steel Columns

A STAR All-steel Column will support more than a wooden post twice its size. These steel columns in the long run are cheaper than large, clumsy unsanitary wooden supports. They offer less obstruction to light and ventilation. They are sanitary and easily cleaned.

Star All-steel Columns are made of reliable material carefully tested and selected. They are not mere shells in which to build columns of concrete.

Their strength is in the steel itself. Their strength can be relied upon because the material is of an even thickness. No filling is needed. Star Stalls can be made to conform to any arrangement of steel columns used in supporting the barn loft. Star Columns can be located behind the stall partitions, if desired, but Star Unit Stalls on the unit system, permit the location of steel columns right in the stanchion row where they take up absolutely no room that could be devoted to any other use.

Columns of any length furnished in five sizes shown below.

Outside Diameter Column Inches	Safe Load in Tons (One-fourth of Ultimate Capacity)				Weight per ft. pounds	Caps or Bases for Columns		
	7 ft.	8 ft.	9 ft.	10 ft.		Col.	Base	Weight
2 3/8	4	3 1/2	3 1/2		3 1/2	2 3/8	4 x4 x 1/2	2 1/2
3	5 1/2	5	4 3/4	4 1/2	3 1/2	3	5 1/2 x 5 1/2 x 1/2	4
4	9 3/4	9 1/4	8 3/4	8	6	4	6 x8 x 3/8	6 1/2
5	14	13 1/2	13	12 1/2	7 1/2	5	8 x8 x 3/4	10

No. 956 STAR Seamless Galvanized Steel Columns

Four-inch steel columns made of new, tested full weight material, hot galvanized inside and out, furnished in any length, with caps and bases.

No. 1217 Concrete Filled Steel Columns

Concrete Filled Columns, complete with caps and bases, 3 1/2 in. or 4 in. in diameter, furnished in any length.



Steel Columns in Mr. Horace Sears' STAR Equipped Barn at Weston, Mass.

No. 1254 Star Rust Proof Base

This heavy cast iron base sets up well above the danger line where steel might in time rust off at the concrete floor. Being made of cast iron it is practically rustproof.

The four inch steel column, the size most generally used, fits down over the top of the base. This prevents the post from being moved. It rests firmly on the ledge 10 inches above the bottom and makes a smooth joint.

For permanence and the assurance of safety these cast iron bases are well worth the slight additional cost above the ordinary kind.

Weight, 23 pounds.

Fig. 956



No. 1254 STAR Cast Iron Rust-proof Post Base. Prevents Posts Rusting Off at Floor Line.

STAR Steel columns are the finishing touch to neatness and sanitation in the well-equipped barn.



Star Individual Manger Partitions in Place

Star Individual Manger Partitions Raised

No. 515 Star Individual Steel Manger Partitions

BY use of Star Individual Steel Manger Partitions the concrete trough can be so divided that each cow has her own feed box. This effectively prevents one cow stealing from another; it prevents waste of feed; it gives the slow eater an even chance and enables you to give each cow just what you want her to have.

Star Individual Steel Manger Partitions place you in a position to feed properly and get the full value out of the feed consumed. Moreover, the danger of any cow overeating can be eliminated by their use.

They accomplish every purpose of the galvanized manger in spite of the fact that they cost less.

While the cows are being fed, Star Individual Steel Manger Partitions stay in place. They are perfectly smooth; no seams, rivets, heads or bolts project; so that it is impossible for the cow to catch hold of them and raise them.

After feeding, when the concrete manger is to be cleaned, the partitions can be lifted and not only raised up out of the trough but tilted clear back out of the way.

The steel of which these partitions are made, is $\frac{1}{4}$ inch thick and protected so that the chemical action of water and of the acids in silage has but little effect.

Their construction is so simple that there is nothing to get out of order.

To those who intend to use Star Individual Steel Manger Partitions, we furnish a templet or wood form with complete instructions for making the concrete manger of proper shape sent free with other goods when specified.

Finished in gray enamel, thoroughly baked on.

No. 515 Star Individual Steel Manger Partitions, for use with any type of Star stalls, weight each, 15 pounds. *Be sure to give width of stalls when ordering manger partitions.*

No. 1268 Star Feed Guard Rails

THE Star feed guard rail is designed to prevent cows from nosing hay and other bulky feed out of the manger. It is $1\frac{5}{8}$ " in diameter. The curved supports to which the rail is firmly fastened with heavy malleable clamps are also $1\frac{5}{8}$ " thick. These supports are inserted 6 or 8 inches into the concrete and hold the rail 6 or 8 inches above the edge of the manger and 4 to 6 inches in from the manger edge. Supports are placed opposite every third stall partition as shown in the illustration at the right. Weight per foot, with supports, 2 lbs.



Star Manger Partitions and No. 1268 Feed Guard Rails in Barn of Springfield Dairy Products Co., Springfield, Ohio



Fig. 739

No. 739 Star Chain Alley Gate

A Star chain alley gate can be made to fit any opening merely by lengthening or shortening the chain. It is fitted with a simple automatic lock.

When not in use it is suspended from the front ends of the stall partitions on either side. It can be locked at the center or at the side.

Furnished in gray enamel, thoroughly baked on. Weight of 3'6" gate, 8 lbs. Be sure to specify width.

No. 1219 Star Salt Cup

Where Star salt cups are used, each cow gets all the salt she wants and is not obliged to eat more than she likes. Salt enough to satisfy the craving of the average cow greatly increases her thirst; she drinks more water and since milk is about 87% water, she produces more milk.

The Star salt cup is made of cast iron. It holds about a quart of loose salt and is provided with a rim which prevents cows from spilling it. A universal bracket permits it to be attached to the upright of any standard make of steel stall or to a wood frame.

Finished in gray enamel baked on. Weight each 6½ lbs.

No. 1264 Star Salt Cup is exactly like the one described above except that it is heavily coated with white baked porcelain enamel. Weight each, 6½ lbs.

No. 536 Star Name Plate

The Star name plate is a pressed steel frame fitted with two pieces of celluloid between which the name or record card is placed. Record cards measure 3½x11".

Name plates furnished in gray enamel, weight each 1¼ lbs.

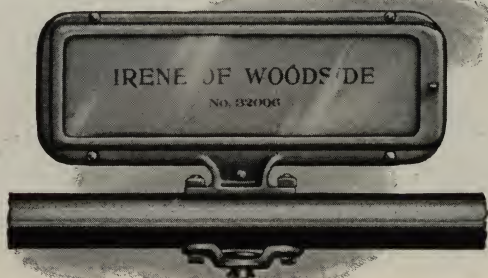


Fig. 536

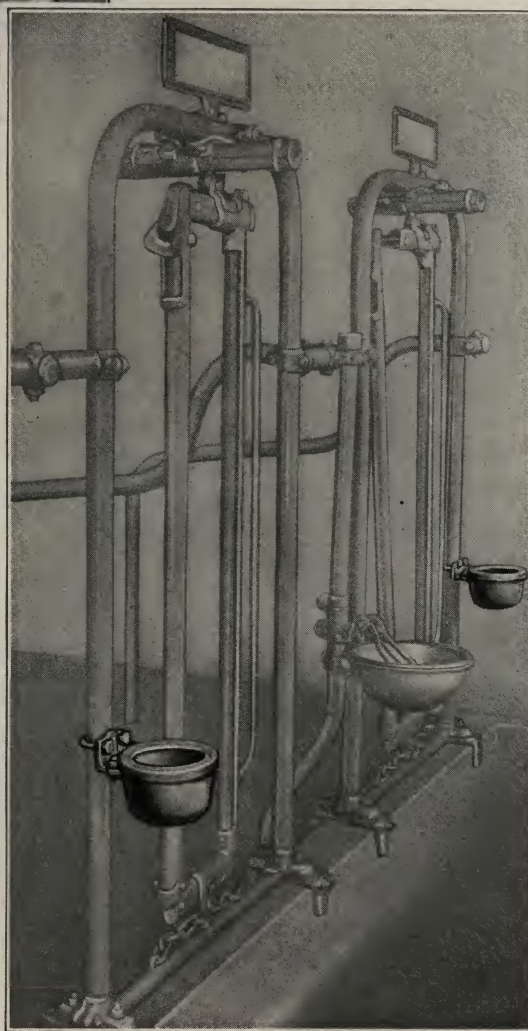


Fig. 1219

No. 203 STAR AUTOMATIC Water Bowl



THIS is a trouble proof bowl which meets all requirements of the ideal water bowl and is offered at a very reasonable price.

It gives the cow a drink whenever she wants it, day or night, and the extra milk the cow gives will soon pay for the bowl.

When a cow rests her chin on the paddle or valve lever, it opens the rust proof brass valve and lets in the water. When the cow quits drinking and lifts her chin, the valve snaps shut so that the bowl does not over-flow. This valve paddle lifts high so that feed falling into the bowl can be easily removed. The bowl and valve are mounted independently. This makes it possible to set the valve higher or lower in the bowl as desired.

The accompanying illustration shows the bowl clamped to a steel stall post. Clamps are provided with the bowl to fit any standard make of steel equipment. The same clamp can be used to fasten a bowl to wood stalls.

The valve is tapped for 1-inch pipe which will bring the water as fast as any cow can drink it. We recommend 1-inch pipe as being most practicable, although, when specified, bowls can be tapped for $\frac{3}{4}$ -inch pipe.

The bowl rests against a supporting post at two points so that it cannot be worked loose. Only a set screw has to be turned to take down the bowl when necessary to get at the valve.

Finished either galvanized or baked-on gray enamel complete with clamp brackets illustrated.

Weight each, 12 lbs.

No. 235 STAR Stationary Water Bowl With Slanting Valve Lever

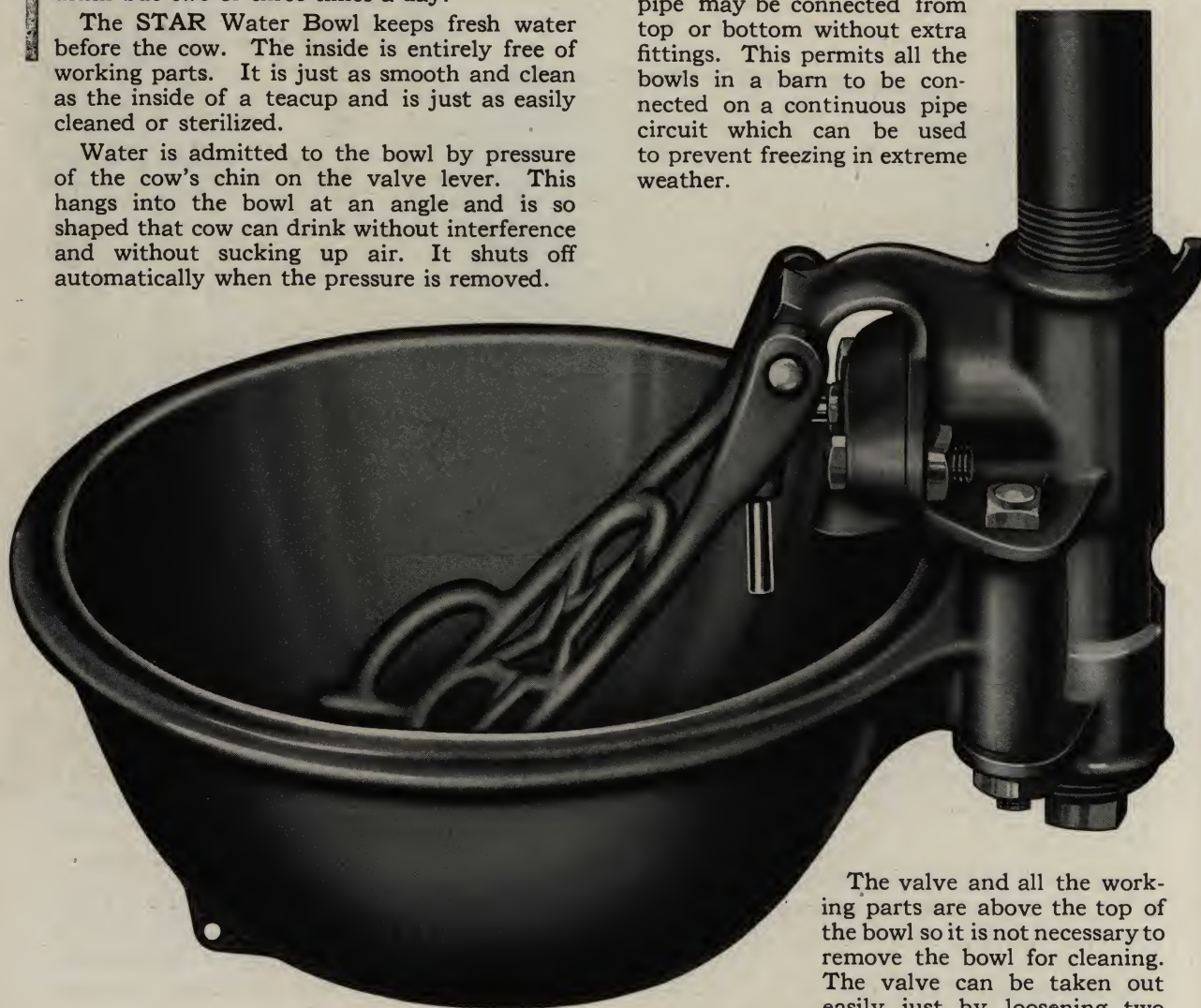
ANY cow that can get a drink whenever she wants it will give more milk, will be healthier, more valuable and more profitable than she would be if she was able to drink but two or three times a day.

The STAR Water Bowl keeps fresh water before the cow. The inside is entirely free of working parts. It is just as smooth and clean as the inside of a teacup and is just as easily cleaned or sterilized.

Water is admitted to the bowl by pressure of the cow's chin on the valve lever. This hangs into the bowl at an angle and is so shaped that cow can drink without interference and without sucking up air. It shuts off automatically when the pressure is removed.

The valve chamber is threaded for one-inch pipe, which will bring the water as fast as the cow drinks it, under any pressure.

A patented feature of this bowl is that the pipe may be connected from top or bottom without extra fittings. This permits all the bowls in a barn to be connected on a continuous pipe circuit which can be used to prevent freezing in extreme weather.



The valve chamber is made of certified malleable iron and so is the valve lever, the lever being hinged on a brass pin which is rust-proof.

The Fuller ball which closes the valve when the pressure is released is made of tough rubber, which resists wear, but is so soft and pliable that it fits snugly and prevents the valve leaking under any pressure.

The valve and all the working parts are above the top of the bowl so it is not necessary to remove the bowl for cleaning. The valve can be taken out easily just by loosening two

bolts, when the fuller ball becomes worn or other replacements or adjustments have to be made. The aluminum lining illustrated in connection with the No. 240 bowl on the next page can also be used with the No. 235 bowl.

The No. 235 water bowl operates under any pressure; can be attached to STAR Stalls or any other standard make of steel stalls or to wood.

Finished in gray enamel. Weight each, 15 lbs.

No. 240 Star Stationary Water Bowl With Pendulum Paddle

THE No. 240 STAR Water Bowl is just like the bowl on the preceding page except that it has the Pendulum Paddle or valve lever instead of the slanting type.

This bowl is made without seams, notches, corners or other features which would make the inside surface uneven. For this reason it is very easy to clean and to keep clean without removing the bowl from its fastening.

Works under any pressure. Fastened to wood or steel stalls. Piped from above or below. Weight 12 lbs.



When it becomes necessary to detach this bowl this can easily be done by removing the two strong bolts which hold it in place.

The valve chamber of the STAR Stationary Bowl is made of high grade malleable iron. It is threaded at top and bottom so that a one-inch pipe can be inserted from above or below. Because the pipe can be introduced from both above and below, it is possible to put all the bowls in one barn on a line of pipe where there is a continuous flow.

The valve chamber is so arranged that any sediment which might otherwise gather and clog the valve, settles away from the working parts and leaves the valve free.

The valve is kept closed by a soft pliable Fuller ball held in place by a stiff, phosphor bronze spring.

Individual Pressure Control on Each Bowl

A stainless steel bushing is inserted into the center of the valve cap around the valve stem. It can be screwed in or out to regulate the swing of the valve paddle and control the opening in the valve so that the same bowl can be used under the highest or the lowest pressure.

Spun Sheet Aluminum Lining Makes Sterilizing Practical

No. 1179 Aluminum lining can be added at any time for a few cents additional. It is easily slipped in or out of the bowl and fifty of them can be carried in one arm as shown in illustration on next page.

The whole fifty can be scalded at one time in an ordinary wash boiler on the kitchen stove.

48 REASONS WHY STAR



1. Star bowls are the easiest for the cows to operate because the valve is opened by the cow resting her chin on the valve lever. It snaps shut when she quits drinking and lifts her chin.

2. The valve lever swings back, not down. This gives the full depth of the bowl to drink in and eliminates the danger of sucking up air while drinking.

3. As the valve lever moves back instead

of down, it cannot be clogged by the accumulation of silage or other feed in the bottom of the bowl.

4. The valve lever raises clear up out of the bowl so that the bowl does not have to be detached for cleaning.

5. The valve lever locks up automatically. This prevents water being turned on while the lining is out of the bowl or at any other time when it is desirable to shut off the water. It falls back into working position when the locking pin is lifted.

6. The valve lever is shaped to prevent cows from lapping, splashing and spilling water, but the projections are smooth and will not lacerate or irritate the cow's tongue.

7. The valve is constructed entirely of brass and cannot rust or corrode.

8. The valve sets in a horizontal position. It cannot be clogged by sediment. The sediment settles in the bottom of the chamber away from the valve.

9. Worn fuller balls can easily be replaced without taking off the bowl because the valve sets up clear of the bowl where it is easy to get at.

10. Valve chamber is tapped for 1-inch pipe which brings plenty of water under the lowest pressure.

11. Bowls can be furnished for $\frac{3}{4}$ -inch pipe if desired, but $\frac{3}{4}$ -inch pipe is not recommended.

12. Spun aluminum linings can be added to the bowls at any time.

13. Aluminum linings make sterilizing easy and practical.

14. Aluminum linings are held in place, where necessary, by a spring and a snap. They are easily removed with one hand but cannot be nosed out by a cow.

15. Aluminum linings eliminate the need of heavy, special sterilizing equipment. Fifty linings can be nested, carried on one arm and sterilized by scalding, all at one time, in an ordinary wash boiler on the kitchen stove. Specify No. 1179 aluminum linings when aluminum linings are wanted.

16. A stainless steel bushing inserted in the center of the valve cap around the brass valve stem can be screwed in or out to control the swing of the valve lever. This regulates the opening in the valve so that the flow

of water into the bowl is the same under the highest or lowest pressure.

17. When the stainless steel bushing is screwed out, it cuts down the flow of water under high pressure and prevents splashing and flooding. When it is screwed in it brings the maximum flow under low pressure.

18. The pressure governor eliminates the "chugging" and "hammering" which otherwise occur in the pipe line under high pressure.

19. It accurately regulates the flow of water to the needs of the cow using each bowl.

20. The individual pressure governor eliminates the use of expensive, sensitive and troublesome pressure governors used in high pressure lines.

21. It is not bothered by sediment in the pipe line.

22. It removes all temptation to cut down main line pressure, which might prevent cows at the far end of the barn from getting enough water.

23. The valve chamber being tapped above and below makes installation easier and reduces the number of pipe joints.

24. The bowls can be placed on a continuous circuit so that stagnant dead ends are eliminated.

25. Freezing can be prevented by placing a faucet at the end of the line and allowing it to drip during freezing weather.

26. Bent pipe used where bowls are piped from below replaces three nipples and two elbows, and eliminates four pipe joints. It saves trouble, time and money and looks neater.

27. The heavy cast iron bowl itself is perfectly round and smooth so that feed accumulations are easily scooped out with the hand and it is never necessary to detach the bowl for any purpose whatever.

28. The bowl is smooth on the inside and easy to clean as a teacup.

29. The bowl is fastened to the valve chamber by two heavy bolts so that it cannot be worked loose, knocked off, or broken.

30. The bowl cannot be bent or dented by rubbing or bumping.

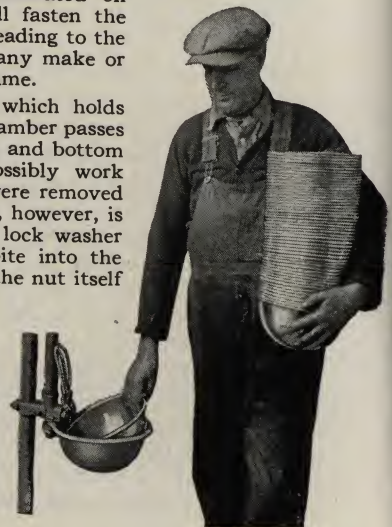
31. None of the working parts are in the bowl. This allows more room for the cow to drink.

32. There are no corners, lugs or crevices in the Star bowl where dirt might collect or feed gather and sour.

33. Universal clamp illustrated on the following pages will fasten the STAR bowl, or a pipe leading to the bowl, to steel stalls of any make or to a wood stanchion frame.

34. Each of the bolts which holds the bowl to the valve chamber passes through an "ear" at top and bottom so the bolt cannot possibly work loose, even if the nut were removed from the bolt. The nut, however, is fastened with a special lock washer with hard teeth that bite into the valve housing and into the nut itself and prevent the nut from turning.

35. The valve paddle is hinged to the valve housing, directly above the point where the paddle comes in contact with the valve stem so that the mounting is independent of the valve cap.



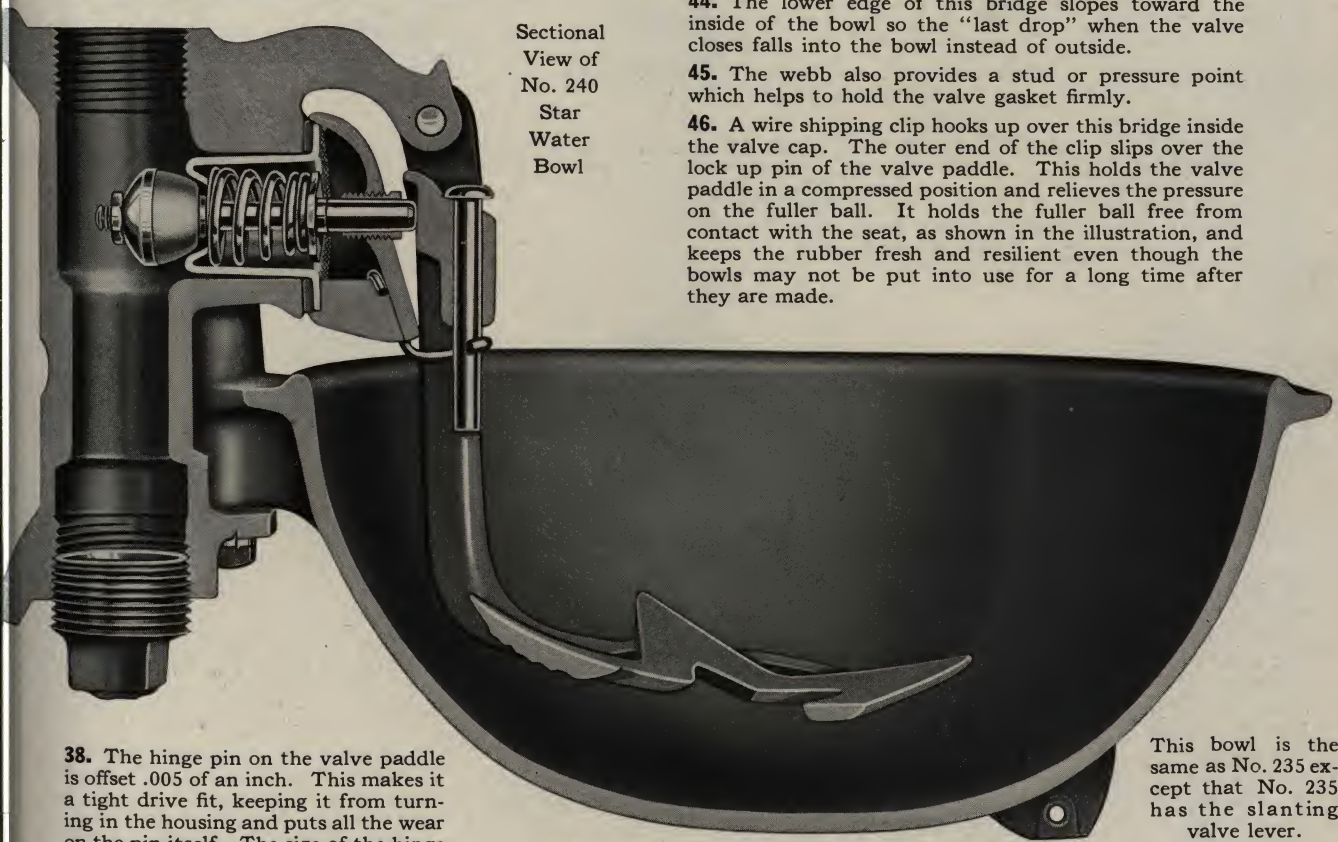
WATER BOWLS ARE BEST

36. The wear on the brass valve stem and the stainless steel bushing which surrounds it are practically eliminated because the movement of the valve stem is in a horizontal direction.

37. A tight brass cap fits over the end of the valve stem. This takes up what little wear there is. If after many years the amount of wear is objectionable, this brass cap can be slipped off and replaced.

In a recent laboratory test a valve was connected with a motor and, after being opened and closed 800,000 times, it showed less than 1/1000 of an inch wear on the little brass cap over the end of the valve stem.

Sectional
View of
No. 240
Star
Water
Bowl



38. The hinge pin on the valve paddle is offset .005 of an inch. This makes it a tight drive fit, keeping it from turning in the housing and puts all the wear on the pin itself. The size of the hinge pin has been so increased as to double the wearing surface as compared with pins previously used, but if after years of use it does show too much wear, the hinge pin can be taken out and replaced with the lock-up pin. The worn hinge pin will be a perfectly satisfactory replacement for the lock-up pin.

39. The valve cap is so designed that it forms a complete rim around the rubber gasket. The harder the pressure on the paddle, the tighter the gasket is held so that any possibility of leakage through the valve cap gasket is eliminated.

40. The inside end of the bushing which surrounds the valve stem is spread .006 to .007 of an inch. This locks it in place so that it will not turn out except when a wrench is applied to it.

41. The valve spring is so designed that the fuller ball moves straight back when opened and seats perfectly when the valve closes.

A fuller ball removed from a bowl which had been operated 800,000 times in a laboratory test showed very

slight wear, due to the above feature and the shape of the valve seat and even the slight wear that showed up was distributed evenly so that the valve did not leak.

42. The principle of the Venturi Nozzle is applied to the design of the valve cap, the opening where the water comes into the bowl being larger than the opening where it enters the valve chamber. This eliminates any possibility of water leaking out around the valve stem.

43. The web or bridge which divides the opening in the valve cap breaks up the solid stream of water and prevents a swirling motion.

44. The lower edge of this bridge slopes toward the inside of the bowl so the "last drop" when the valve closes falls into the bowl instead of outside.

45. The webb also provides a stud or pressure point which helps to hold the valve gasket firmly.

46. A wire shipping clip hooks up over this bridge inside the valve cap. The outer end of the clip slips over the lock up pin of the valve paddle. This holds the valve paddle in a compressed position and relieves the pressure on the fuller ball. It holds the fuller ball free from contact with the seat, as shown in the illustration, and keeps the rubber fresh and resilient even though the bowls may not be put into use for a long time after they are made.

This bowl is the same as No. 235 except that No. 235 has the slanting valve lever.

47. The shipping clip holds all the valves in the system open when the water is turned on so that the system can be flushed to get rid of pipe thread cuttings or any other foreign matter that might go into the system in the course of installation.

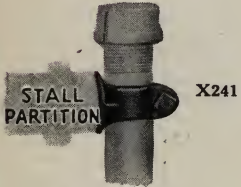
48. The Star water bowl is built with watch-like precision. The hinged parts are die formed and checked within limits of .002 of an inch.

The brass valve stem is a screw machine job, built within the same limits. The inside diameter of the valve stem cap and the outside diameter of the valve stem are within .001 of an inch. The stainless steel bushing surrounding the valve stem is built in the same precise way. The phosphor-bronze valve spring is run between parallel emery wheels after leaving the spring machine to keep the ends absolutely parallel.

The retaining washers for both spring and fuller ball are die-formed within limits of .002 of an inch. The brass cap over the fuller ball is an accurate fit.

All this precision means long life, easy operation and perfect satisfaction with Star water bowls.

Fittings For STAR BOWLS



X241



A442

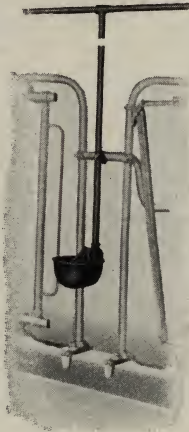


Fig. 911

Attached to STAR Steel Stalls. Supply from above. Fastened with Clamps X241 and A442.



Fig. 912

Attached to STAR Steel Stalls. Supply from Back of Curb. Fastened with Clamps X241 and A442.



Fig. 913

Attached to STAR Steel Stalls. Supply from Front of Curb. Fastened with Clamps X241 and A442.

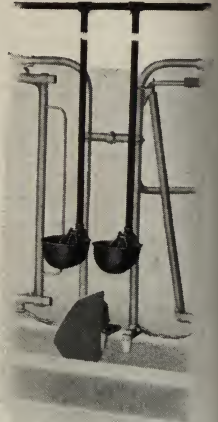
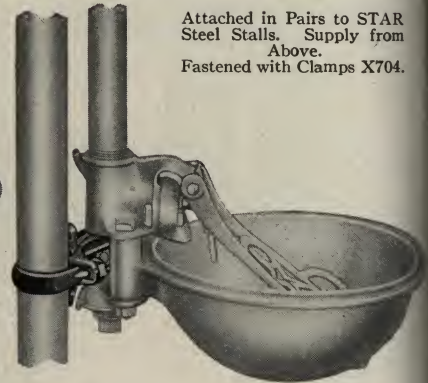
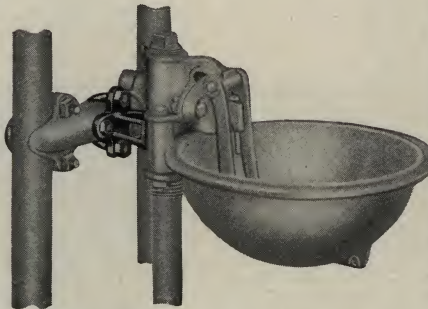


Fig. 915

Attached in Pairs to STAR Steel Stalls. Supply from Above. Fastened with Clamps X704.



No. X241 Pipe Clamp—Fits into partition between Star Stalls (Figs. 911, 912 and 913). Included with bowl. No extra charge.

No. A442 Pipe Lock—Clamps around pipe above or below bowl. Fits over lug or projection on valve chamber. Prevents bowl from twisting on pipe. Included when required.

Universal Clamp No. X704 furnished with all Star Water Bowls may be used as shown above to clamp the bowl to a horizontal supporting pipe extending between the legs of two adjacent stall arches. The other bowls shown on these pages may be installed the same as the No. 240 bowl illustrated.

Above illustration shows the No. X704 Universal Clamp holding the No. 235 bowl at an angle (45 degrees) from the clamp. This sets the bowl at right angles to the stanchion row—between two stalls. The other bowls shown on these pages can be mounted the same way.



Fig. 927

Attached to Wood Upright. Supply from Above. Fastened with Clamp X704.

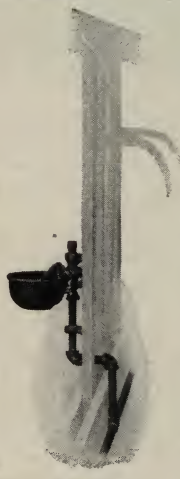


Fig. 926

Attached to Wood Upright. Supply from Behind. Fastened with Clamp X704.



Fig. 925

Attached to Wood Upright. Supply from Front of Curb. Fastened with Clamp X704

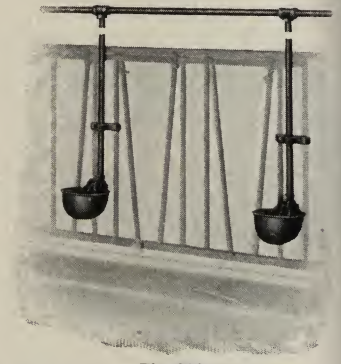


Fig. 920

Attached to STAR Steel Calf Pen Supply from Above. Fastened with Clamps A450, X17 X180 and A442.

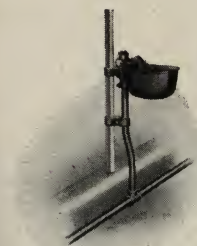


Fig. 924

Attached to Upright Post of Steel Stalls of any make or kind. Supply pipe in Front of Curb.

Fastened with Clamp X704.



Fig. 923

Attached to Upright Post of Steel Stal's of any make or kind. Supply from Behind Curb.

Fastened with 2 Clamps X704.



Fig. 922

Attached to Steel Upright. Supply from Above.

Fastened with Clamps X704.

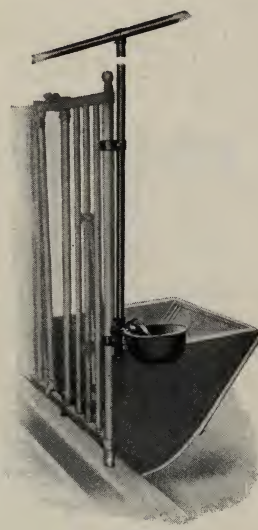


Fig. 919

Attached to 1 1/4 in. Corner Post of STAR Cow Pen with lifting mangers. Supply from Above.

Fastened with Clamp X704.



No. X704 Universal Clamp is shown above, fastening the No. 300 bowl to wood. Other bowls shown on these pages can be installed in the same manner.



Above is the No. 295 bowl held straight out in front to the stall post to which it is fastened with the No. X704 Clamp. The other bowls shown on these pages can be installed the same way.

No. 877 STAR PIPE LINE STRAINER

The heavy tubular brass strainer, 1 3/4 in. in diameter and 6 in. long, is placed as shown so that all the water must enter it and pass out through its pores. It strains out every particle of straw, chaff and other foreign matter which might otherwise cause leaky valves if they found their way to the bowls. It provides about 35 square inches

of strainer surface and will not fill up and clog as quickly as other strainers having a smaller surface. It is easily removed, cleaned and replaced by taking out the two bolts which hold the bottom. When the strainer is removed from the chamber all the dirt, sediment and other foreign matter comes out with it. Threaded for one inch pipe. Weight 5 pounds.

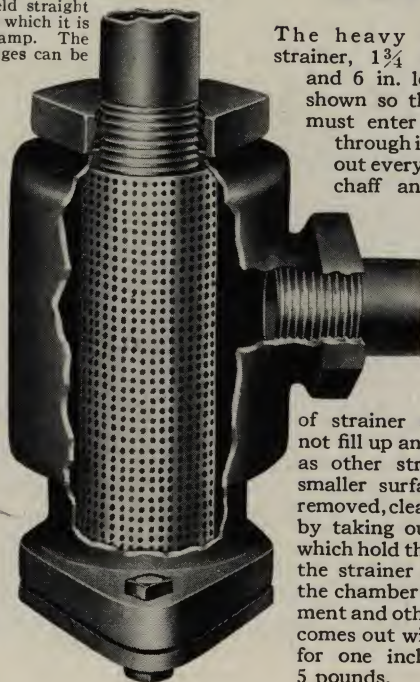


Fig. 917

Attached to STAR Bull Pen. Supply from Above.

Fastened with Clamp X704.

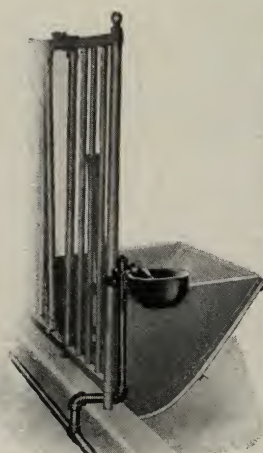
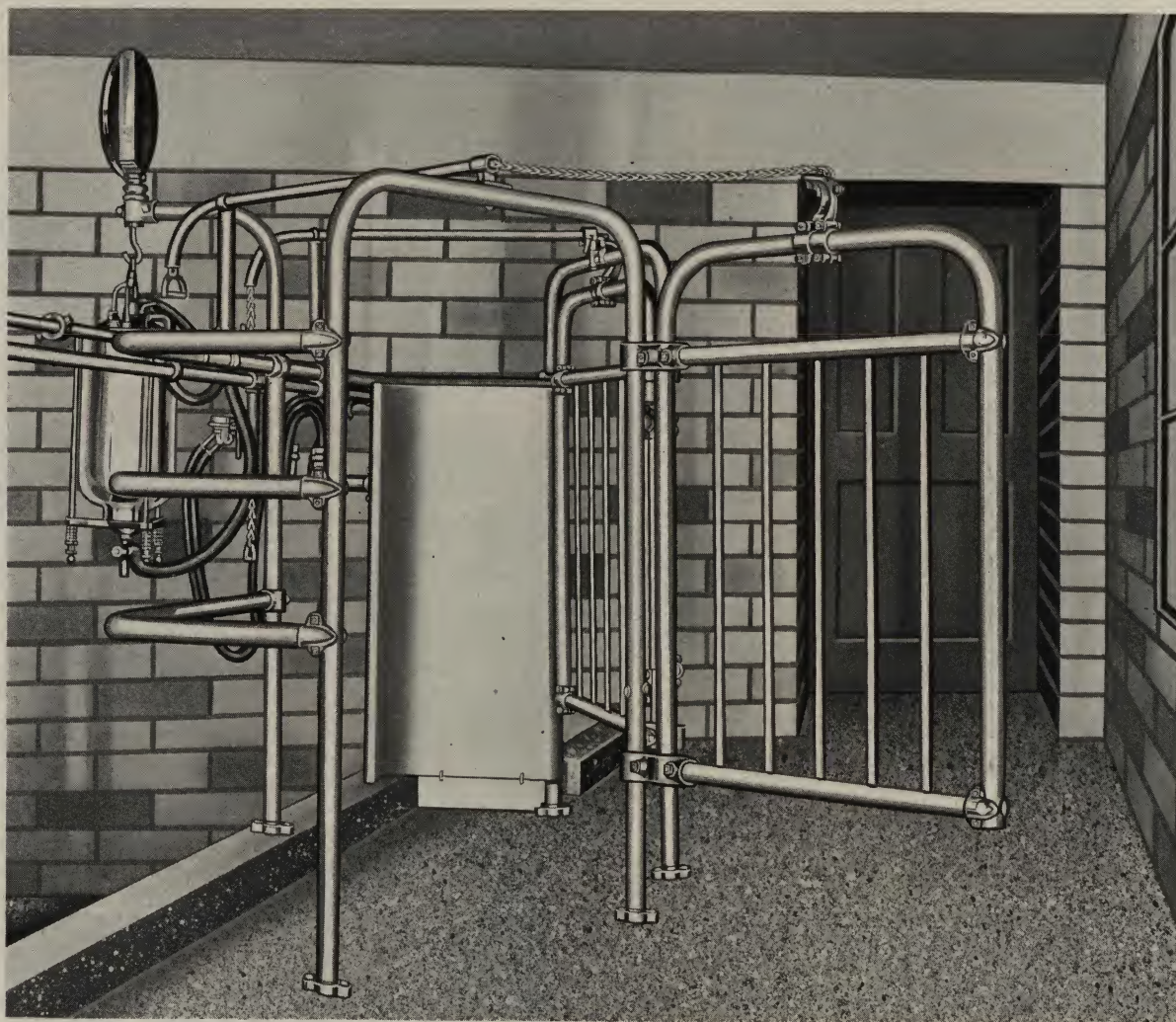


Fig. 918

Attached to STAR Cow Pen with Lifting Manger. Supply from Below

Fastened with Clamps X704.

No. 371 Starline Tandem Milking Stall



No. 371 STARLINE TANDEM MILKING STALL

THE No. 371 Starline Tandem Milking Stall is 8 ft. long and 3 ft. wide overall. It is made of full weight butt welded tested steel pipe measuring $1\frac{1}{4}$ in. inside diameter, $1\frac{5}{8}$ in. outside diameter.

Both ends of the stall are alike. There are no rights and lefts and the front and rear parts are interchangeable. If it should be desired to run the cows in the opposite direction through a row of stalls, all that is necessary is to take off the lower bar in the front of the stall and transfer it to the rear, then to transfer the splash plate to the opposite end of the stall.

The gates come down within 18 in. of the floor. They actually pivot on the gate posts and leave the openings entirely clear of obstruction from post to post. This opening is free of clamps, latches, hinges and other projections either from the arch or the gate itself, so that it is impossible for the animals to injure themselves entering or leaving the stall.

The latch is on the top of the gate—up out of the way. It automatically hooks over the strike plate which is attached to the top of the outer arch when the gate is drawn shut. The gate is closed by pulling the chain which extends back from the gate latch through a pipe to the

side of the stall where the operator stands.

The gate latch is protected by a heavy guard making it impossible for horned cattle to open it.

A finger on the end of the latch tube lifts the latch as the latch tube is given a slight turn by pulling the chain to the right or left.

A device concealed within the hinge plates opens the gate to a position at right angles to the front of the stall. In this position the gate closes the alley and prevents the cow going in any direction but the right one as she comes out of the stall.

All vertical posts are inserted in cement anchors. This makes it possible to lift and move the stall at any time or to make any other alterations. The new type of cement anchor also makes it possible to turn the scale sup-

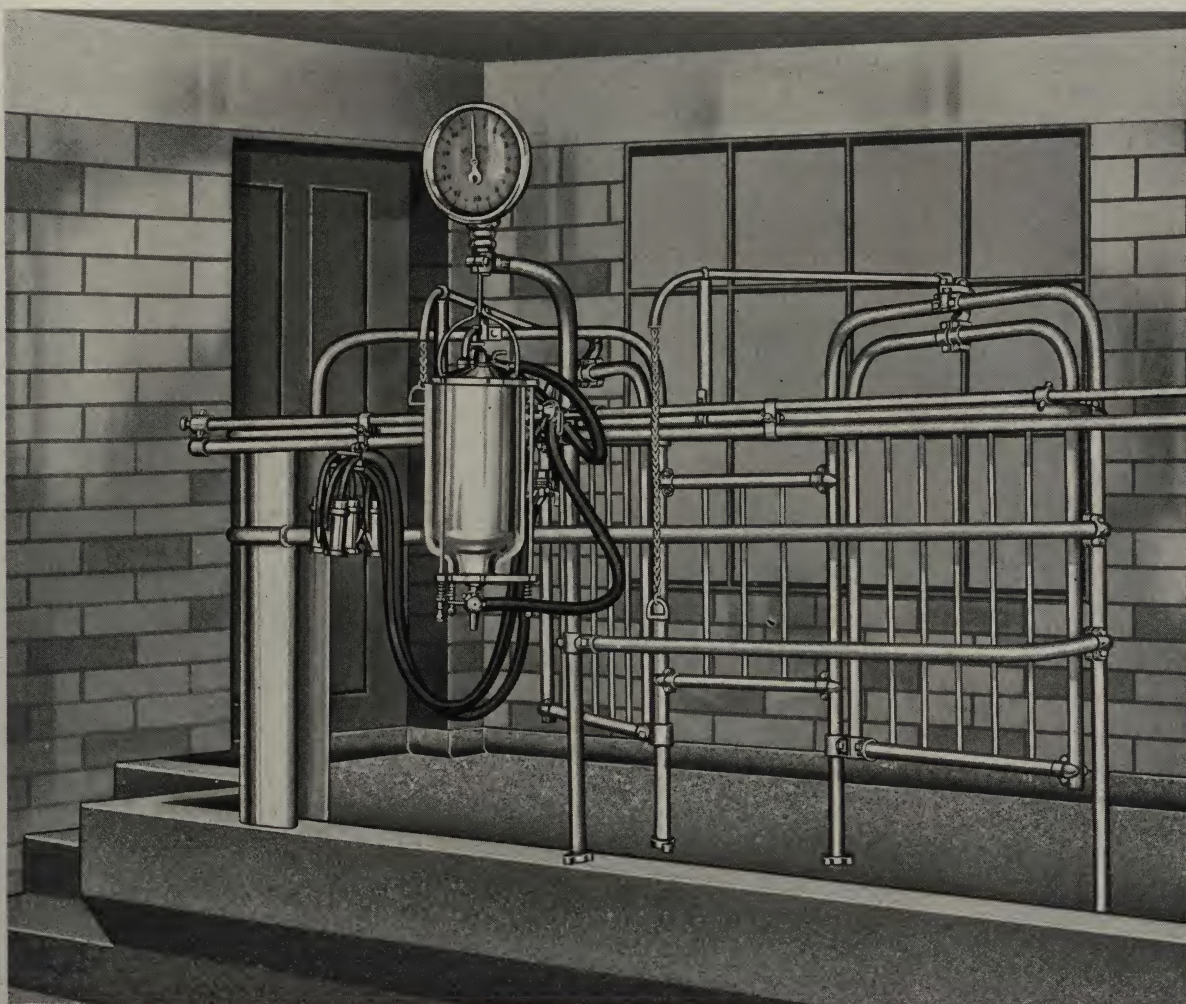
port so that the scale and the glass container which hangs from it can be moved forward or back to suit the convenience and ideas of the operator.

The milk pipe and the airline can be placed either at the level of the top rail or at the level of the lower horizontal rail.

The sanitary milk pipe line can be removed for cleaning just by loosening a thumb nut on each clamp—the airline remains clamped in place when the milk pipe is taken down.

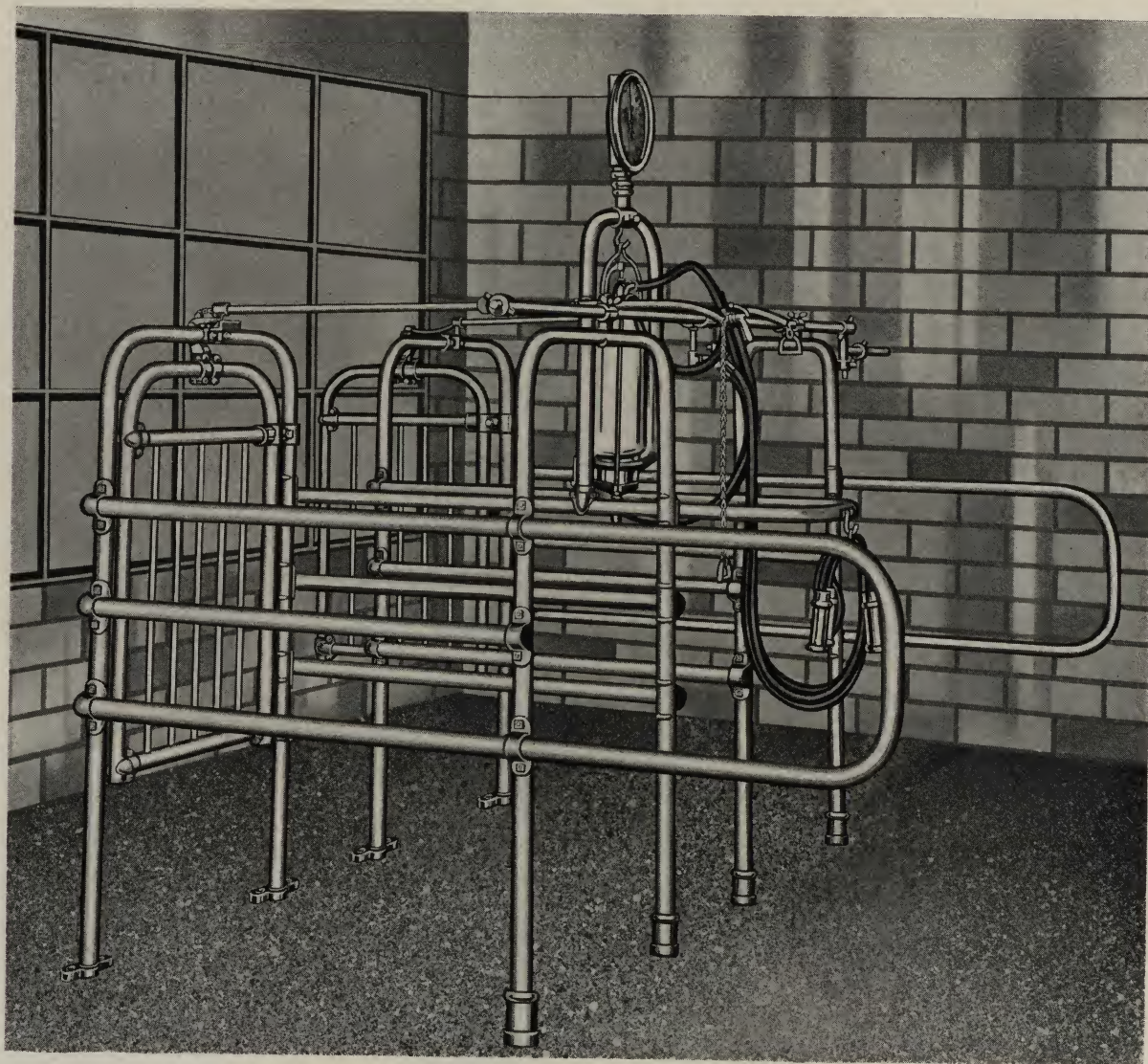
Each stall is a complete, independent unit. Stalls can be set in a straight line or in a circle, or according to any other arrangement and can also be placed any desired distance apart.

Starline Tandem Milking Stalls can be furnished in grey enamel or galvanized finish.



No. 371 STARLINE TANDEM MILKING STALL

No. 261 Starline Abreast Type Milking Parlor Stall



No. 261 STARLINE ABREAST TYPE MILKING PARLOR STALL

NO. 261 Starline Abreast Type Stall measures 7 ft. 8½ in. wide, including 1 ft. 5 in. space between the two member stalls. It is 6½ ft. long.

It is made of full weight butt welded water tested steam pipe (1½ in. O. D.).

Being composed almost entirely of seven one-piece arches the use of corner couplings and other dirt catchers has been eliminated, providing a smooth sanitary job.

By tying the vertical arches together with the horizontal arches a more rigid construction is provided; its strength and rigidity does not depend on the strength and stiffness of clamps.

The vertical arches are 2 ft. 9 in. wide and 5 ft. high and except for the sanitary pipe, air line and support for the scale, there's nothing above the top of the arches—

no disfiguring overhead apparatus and no ceiling connections required.

The few clamps that are used are all one-piece clamps. The end clamps cap the pipes to which they are applied, eliminating open pipe ends and all other forms of filth reservoirs.

Clamps are applied with T-head bolts. This eliminates the rough projections inside the stall frames that would make sharp edged square bolt heads a constant menace to the safety, comfort and appearance of the cows.

The dividing partitions are composed entirely of horizontal bars. Any one who has kept horned cattle knows that hooking or horning is done with an upward stroke. The horizontal bars of the dividing partitions prevent a horned cow from hooking her neighbor through the partition.

Gates at the forward end of the stall may be hung to swing either right or left. The swinging gate entirely eliminates troublesome, unsightly, unsanitary overhead apparatus and connections.

The gate actually pivots on the gate post, leaving the opening entirely clear from post to post. This opening is perfectly smooth with no clamps, latches, hinges or other projections from either the arch or the gate itself to injure animals entering or leaving the stall.

The bottom of the gate is only 18 in. above the floor. The latch is on top of the gate—up out of the way. This is a positive gravity latch that automatically hooks over the strike plate attached to the top of the arch when the gate is drawn shut.

The gate latch is protected by a heavy guard which makes it impossible for horned cattle to open it.

Both gates in a pair of stalls are opened and closed from the same central position back of and between the stalls. A finger on the end of the latch tube lifts the latch when the tube is given a slight turn. A simple device concealed in the hinge plates causes the gate to swing open to a position at right angles to the front of the stall. This closes the alley and sends the cow in the proper direction as she comes out of the stall. Each

gate is closed by pulling the chain which runs back from the gate to the rear of the stall through the latch tube.

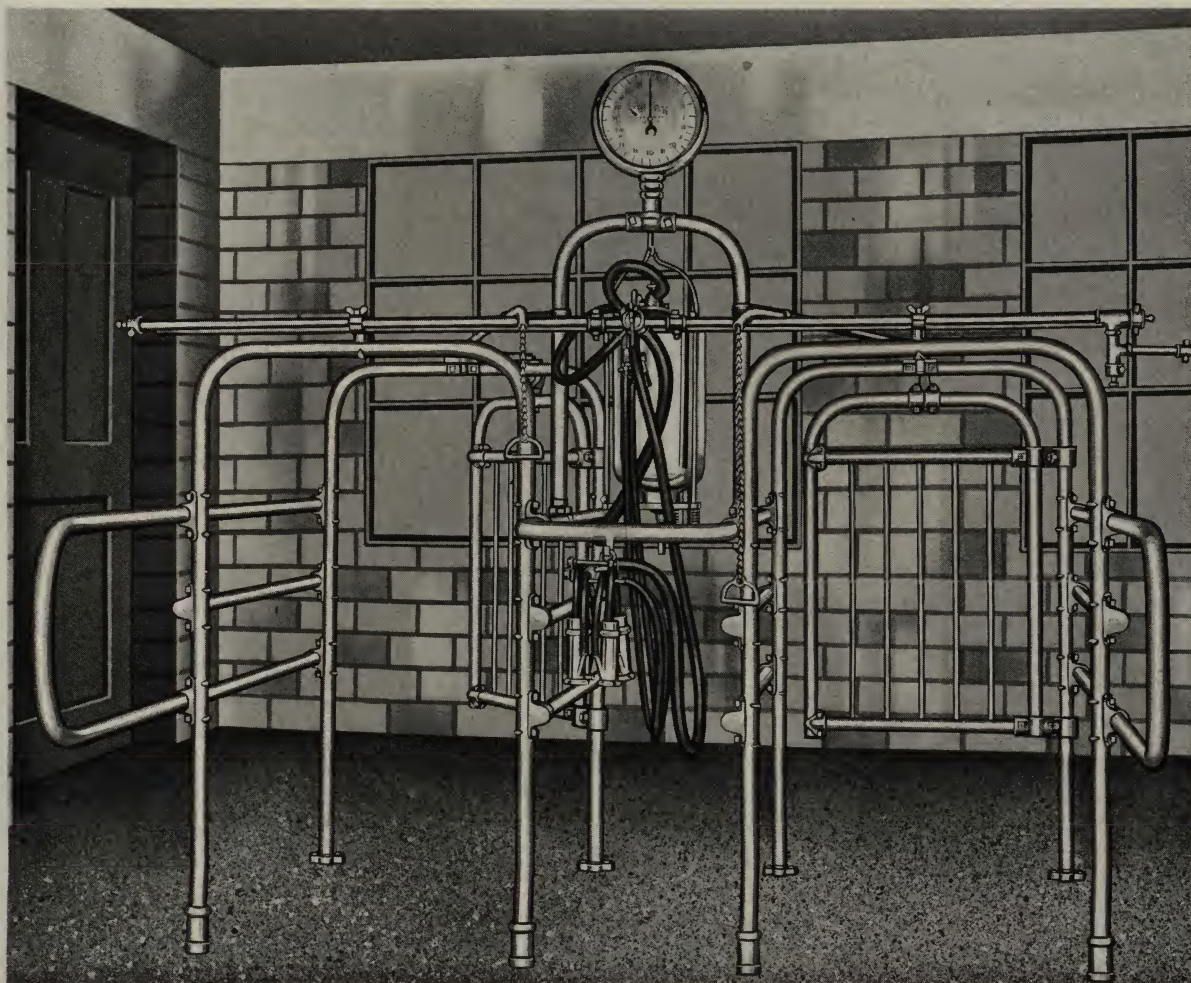
The adjustable support for the milk scale and glass container can be set forward or back—or lowered—as desired.

The sanitary milk pipe line and the air line are carried on clamps at the top of each rear arch. The sanitary pipes can be removed for cleaning by loosening a thumb nut on each clamp. The air line is still clamped in place when the milk pipe is removed.

Because the combined fixtures and the sanitary pipe are so low and so close to each other, the length of the rubber connections is greatly shortened and they are much easier to keep clean than longer rubber connections.

The feet of the rear arches are protected by Starline rust shields. These malleable sleeves filled with rust-proof compound prevent the pipes from rusting off at the floor line.

The feet of the front arches are inserted in Starline cement anchors, which not merely offer protection against rust, but make it possible to lift out the gate arch if at any time it is desired to swing the gates from the opposite side or make any drastic alterations.



No. 261 STARLINE ABREAST TYPE MILKING PARLOR STALL



STARLINE INC.



STAR STEEL BULL PEN WITH SET-BACK MANGER—Assembled in Panels Before Shipment

No. 630 Star Steel Bull Pen

MUCH depends upon the health and vitality of the sire of the dairy herd. His quarters should provide a place for moderate exercise, where he will be comfortable, absolutely safe, and at the same time within sight of the herd. STAR Steel Bull Pens meet just such requirements.

In the STAR Bull Pen illustrated on the opposite page the bull stanchion is set back to permit a concrete manger being used.

The advantages of having the stanchion set back are many. In the first place, no space is taken up in the feed alley or walk in front of the pen. This arrangement makes it very convenient to place the water bowl outside rather than inside the pen, so that it is completely out of the way.

The concrete manger bottom can be rounded so that there are no square corners and so that the manger may be conveniently kept in a clean, sanitary condition.

Those who prefer it or wish to have more than one stanchion in a pen may have an adjustable rigid stanchion placed in the pen panel at any other point.

This stanchion is made of two U-bar steel uprights of the same weight as those used in the Giant stanchion. The wood linings are fitted into them in the same way as in the Giant and mean comfort to the bull and safety to those who work around him. These wood linings increase the strength of the uprights and prevent the stanchion from springing or bending. They have an extreme neck width adjustment of twelve inches and may be built wider when so specified.

STAR Bull Pen Gate is built with a continuous one-piece arch made of $1\frac{5}{8}$ inch O D pipe which extends up both sides and across the top. It insures greater strength and rigidity than if it depended on the stiffness of corner connections. It prevents the gate from sagging and insures the operation of the lock.

The lock on the STAR Bull Pen Gate is a double barreled spring bolt. It locks automatically when the gate is slammed shut but can be opened only by a turn of the hand wheel which operates both bolts at the same time. It can be padlocked.

The gate swings on offset hinges which permit it to be swung back flat against the pen and does not obstruct the passageway in front.

STAR Bull Pen Panel is 5 ft. 2 in. high from the pen floor. The top and bottom rails are of $1\frac{1}{2} \times 2\frac{1}{2}$ inch O D rectangular steel tubing, laid flat. The uprights are of $1\frac{5}{8}$ in. O D round steel pipe. They are 6 inches apart. The ends of the uprights are inserted into the top and bottom rails. Heavy tie rods extending down through the uprights hold top and bottom rails together and make the construction rigid. Panels are assembled before shipment which means a great saving in cost of installation. STAR Bull Pen is finished in gray enamel baked on and is assembled in panels before shipped.

When ordering or when writing for a quotation, send along a rough sketch showing the measurements, as this construction is built to order. Estimates will be gladly furnished.



A STAR Bull Pen Affords Comfort to the Animal and Security to the Owner

Corner Manger for Star Bull Pen

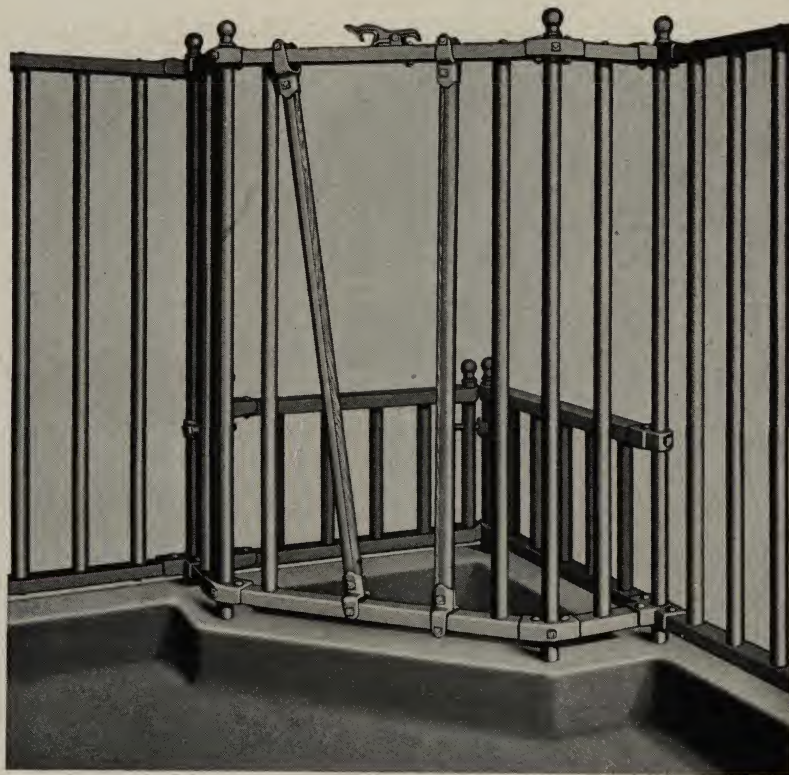
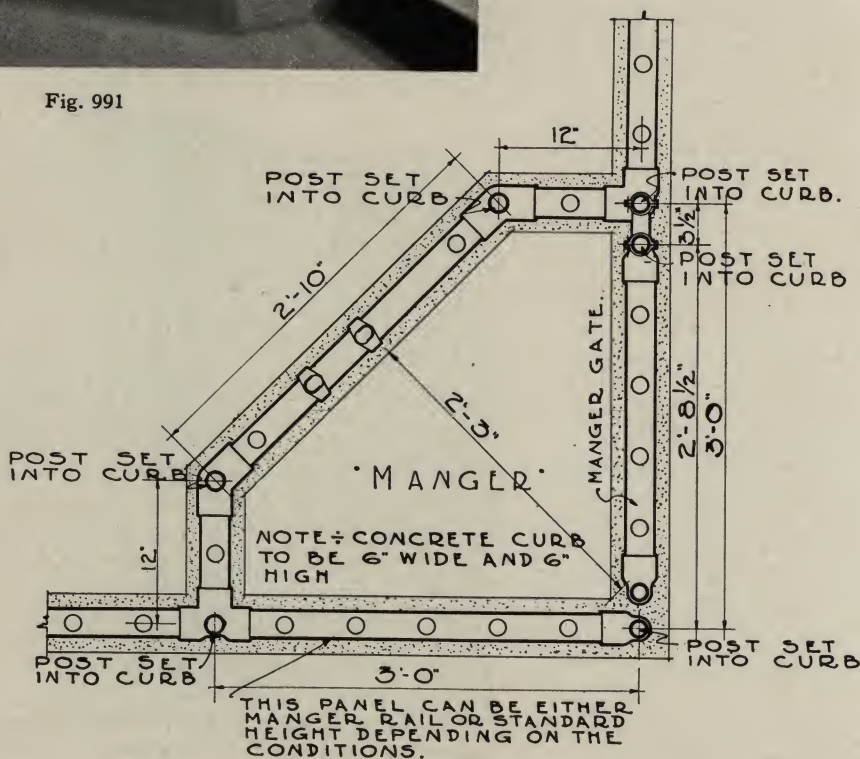


Fig. 991

THE advantage of a manger of this design is that it takes very little room out of the stall or pen.

The photographic illustration shows the triangular manger and stanchion built into the corner of a bull pen and the accompanying diagram shows the shape and dimensions of the manger and the special section of pen panel into which the stanchion is built.

In figuring corner mangers with pens, the panel at the back of the manger is figured by the foot as regular panel, with a slight additional charge covering the necessary additional up-rights and fittings required in its construction. The manger rail, the manger gate and the built-in stanchion are figured separately.



No. 990 Star Bull Pen Gate

Star Bull Pens described on the preceding pages are fitted with gates of a construction and design which matches perfectly the neat, simple, strong and massive construction of the pen itself.

Continuous Double Arch Gives Added Strength

The Star Bull Pen Gate is built with a continuous one-piece arch of 1 5-8 inch O. D. pipe which extends up both sides and across the top. This ensures far greater rigidity than if its strength depended entirely upon the stiffness of the corner connections. It prevents the gate from sagging and the lock bolts always lock.

The arch in which the gate swings is made of a continuous length of 1 5-8 inch O. D. pipe which ties the panels of the pen together. It makes the two parts of the pen thus joined just as firm and strong as if it were one piece. In fact, it gives additional strength and firmness because each leg of the arch goes down into and is firmly imbedded in the concrete curb and floor.

A Lock That Is a Lock

The Lock on the Star Bull Pen Gate is a double barrelled spring bolt. It locks automatically when the gate is slammed shut, but can be opened only by a turn of the hand wheel which operates both bolts at the same time. It can be padlocked as a further and certain precaution against the removal of a valuable animal or the entry of strangers into the pen with a vicious bull.

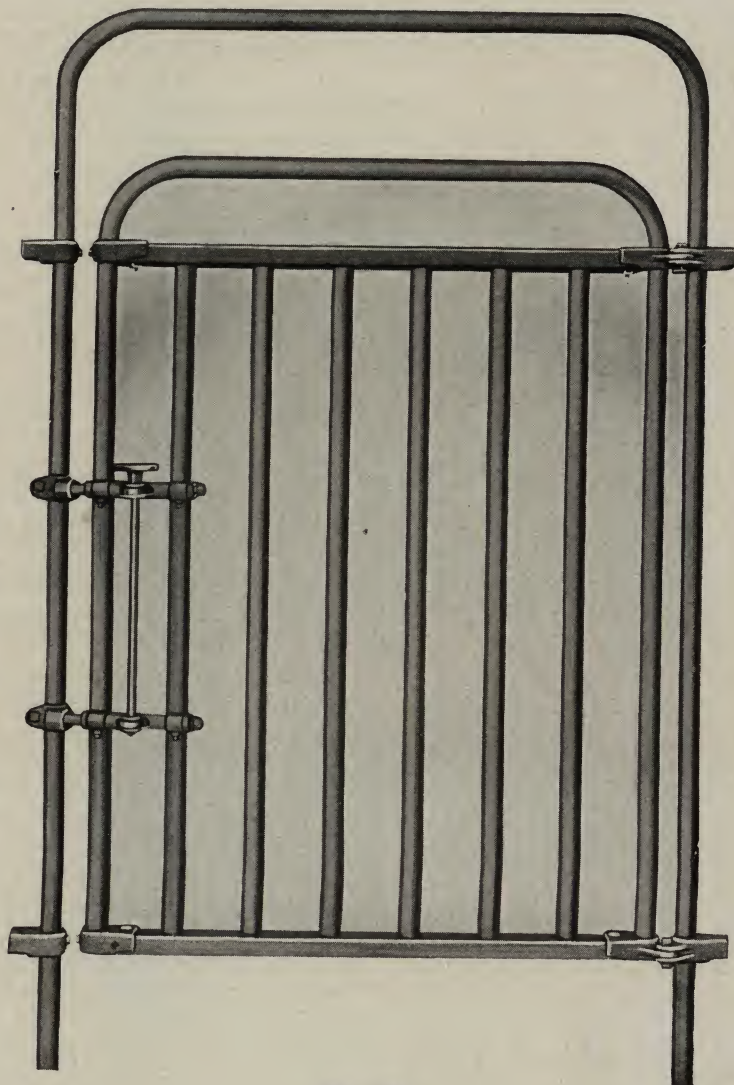


Fig. 990

"Bolted Through" Construction

The corner fittings of the pen are slipped over the arched pipe before the gate is assembled and afterwards securely bolted to the top and bottom rails. The hinges are a part of the cornerpieces and are held together by strong bolts. This carries out the "safety first" idea which is followed in the entire construction of the Star Bull Pen.

Gate Swings Clear Back Out of the Way

The hinges are of an offset type that permits the open gate to be swung back flat against the pen, leaving the passageway entirely clear in front of the pen.

The gate opening measures three feet ten inches in the clear and in figuring pen construction the No. 990 gate, complete with arch as shown herewith, takes the place of four feet of pen panel.

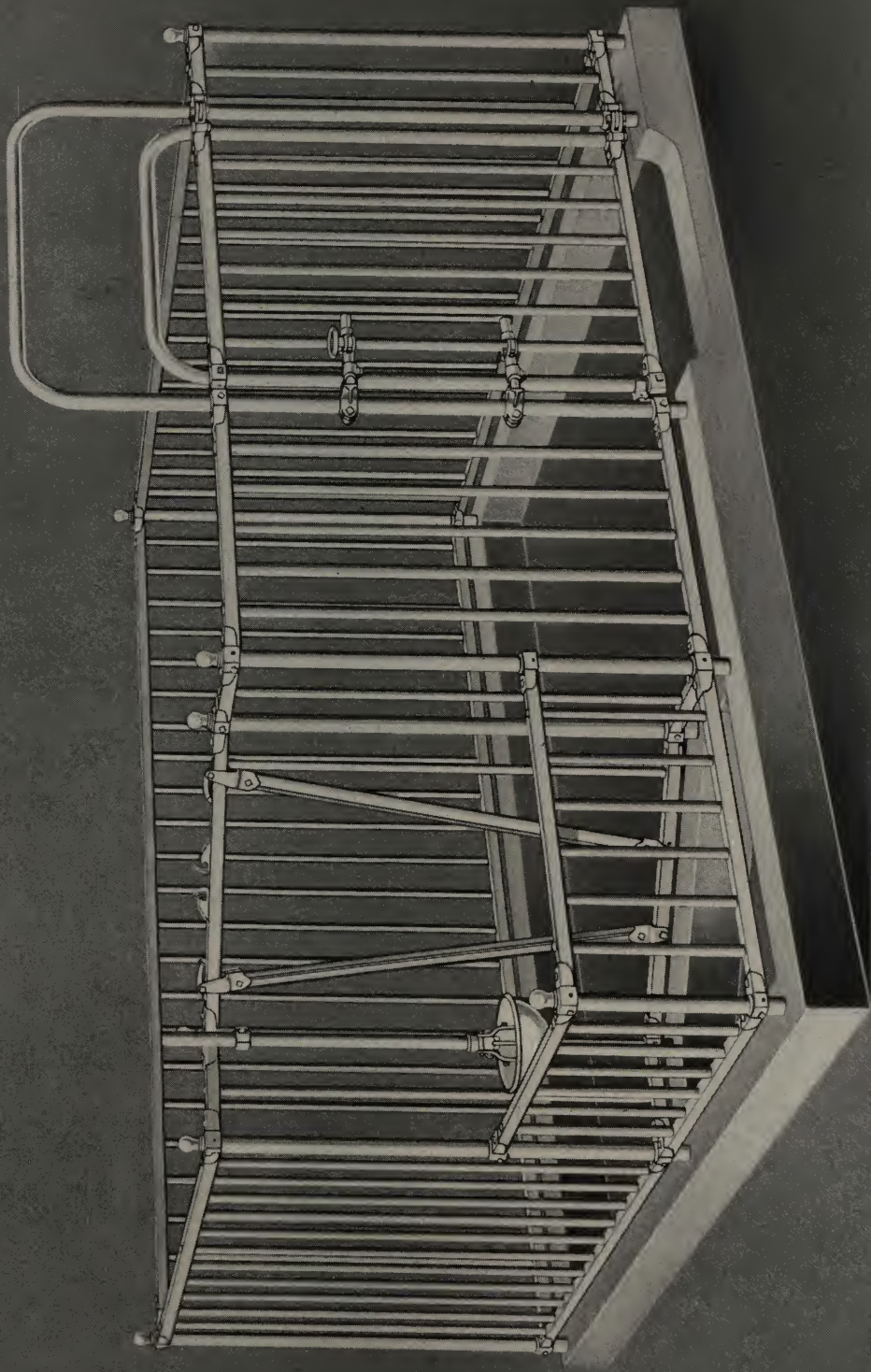


FIG. 631 STAR STEEL COW PEN

No. 631 Star Steel Cow Pen

AT the time of sickness among domestic animals proper care is often the secret of recovery, and costs nothing but a little attention and the application of good common sense in the care of the animals.

There is too much risk involved in allowing cows to pass through the calving period in the old style rigid stanchions. There is the risk of losing the calf and of injury to the mother. The tender, sensitive mother needs more careful attention at this time than at any other. She needs quarters that are clean and roomy, and where she may be quiet, comfortable, easily fed, and have plenty of light and fresh air.

So the need of a good box stall or cow pen is apparent.

STAR Steel Cow Pen is the acme of cleanliness, convenience and sanitation. It can be easily disinfected and placed in perfectly sanitary condition. The open style of construction does away with dead air "pockets" in corners, between floors and walls.

STAR Steel Cow Pen is simple in construction, strong and sanitary. The top and bottom rails are made of $1\frac{1}{2}$ -inch square steel tubing. The corner posts are of $1\frac{5}{8}$ -in. O. D. steel pipe. The upright bars are made of $1\frac{1}{16}$ -inch O. D. steel pipe and are placed 5 inches apart on centers and are inserted into top and bottom rails. Heavy tie rods extending down through the uprights connect the top and bottom rails. The top and bottom rails are thus tied at intervals of 20 inches; so that this construction does not depend for its strength upon the fastenings at the ends of the panel.

The top and bottom rails are both free of clamps and other dust catchers.

STAR Cow Pen may be fitted with an

adjustable stanchion. The uprights of this stanchion are made of U-bar steel, the same as is used in the Giant stanchion. The wood core or lining completely fills the U-bar. This prevents the bars of the stanchion from springing out of shape, and is quite a marked improvement over the tubular stanchions usually furnished with pens.

Cow pens can be had in panels or sections of any desired length. Each panel or section is assembled at the factory. The corner posts and the legs of the gate arch are all that need to be imbedded in cement, so that installation is simple and easy.

STAR Steel Cow Pen Panel, height 4 feet 8 inches from the pen floor, finished in gray enamel.

Gate fittings for STAR Steel Cow Pen include double arch, hinges and automatic safety lock. STAR Steel Cow Pen may be fitted with rigid wood lined adjustable steel stanchion and STAR Self-cleaning Lifting Manger, additional weight, 100 lbs., or with a STAR Automatic Hay Rack, size 36x36 in., weight 42 lbs.



Comfortable and Contented in a STAR Steel Cow Pen

No. 992 Star Cow Pen Gate

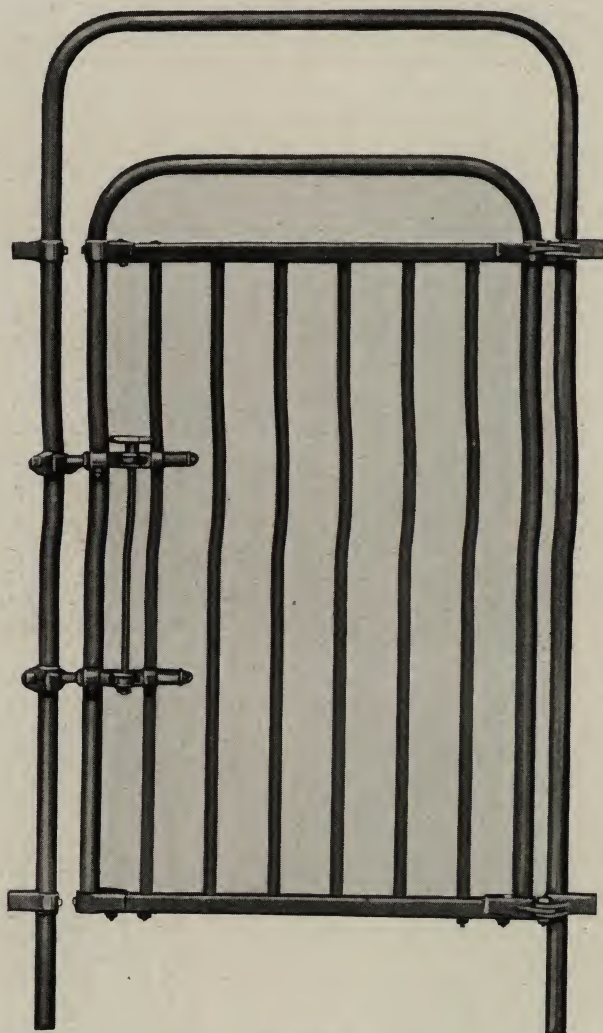


Fig. 992

THE No. 992 Star Cow Pen Gate is constructed like other parts of the cow pen except that the end uprights, in addition to being connected by the regular top rail and its heavy malleable couplings, are also connected by a continuous one-piece arch. This arch gives double strength and rigidity to the gate.

“Bolted-Through” Construction

The “Bolted-Through” construction in the Star Cow Pen Gate is not confined to the bolts which run from the top to the bottom rail and hold them tightly together. The corner connections are not clamps, but are brackets shaped to fit the top and bottom rails, and are securely fastened to these rails by bolts that pass through from top to bottom.

The gate is swung in an arch which conforms to the same style of construction as Star Steel Stalls. This arch ties together the sections of the panel in which the gate is hung and makes it practically as strong and rigid as if it were built in one continuous piece.

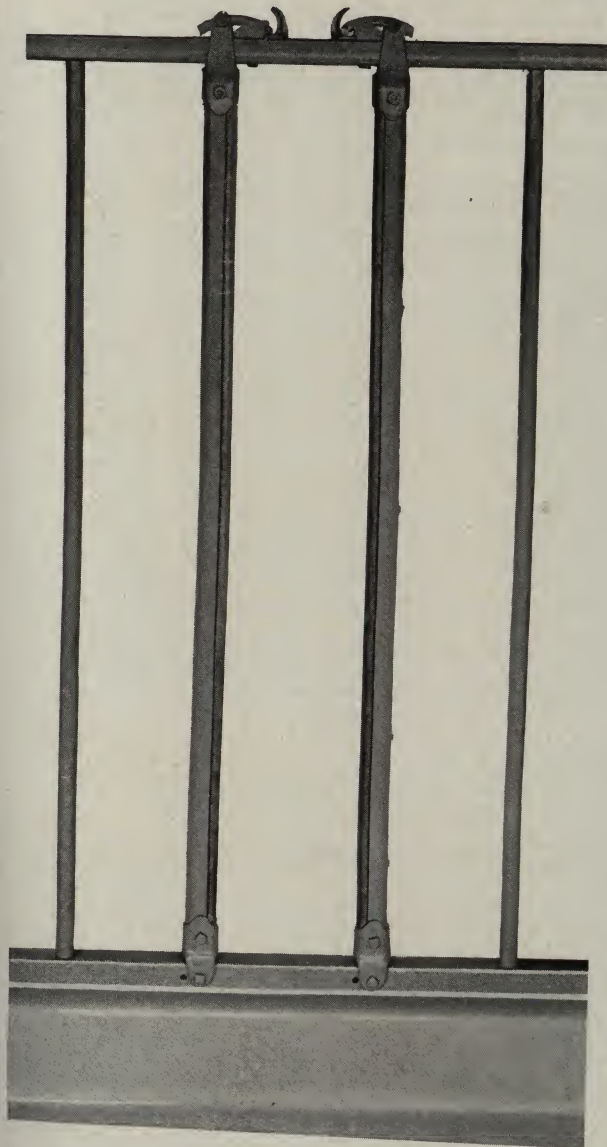
The off-set hinges with which the Star Cow Pen Gate is fitted permit the gate to

swing back flat against the pen when opened. This is a convenience as the gate will never stick out into the alley or drive.

The automatic lock of the Star Cow Pen Gate is a double barreled spring bolt which locks automatically when the gate is closed. It can be unlocked only by turning the hand wheel that operates both bolts, and can not possibly be opened by accident. Can be padlocked also, if desired.

The gate opening in a Star Cow Pen measures three feet three inches in the clear, and in measuring cow pen construction the gate complete with arch, as shown herewith, takes the place of three feet four inches of pen panel.

No. 979 Star Two-Way Stanchion for Cow Pens and Bull Pens



No. 979—Closed

BOTH bars of the No. 979 Star Two-way Stanchion are hinged to the bottom rail of the pen panel into which the stanchion is built. This allows the stanchion to be opened either to the right or to the left.

When opened both ways it gives the animal freer access to the manger than can be had with a stanchion which opens only in one direction.

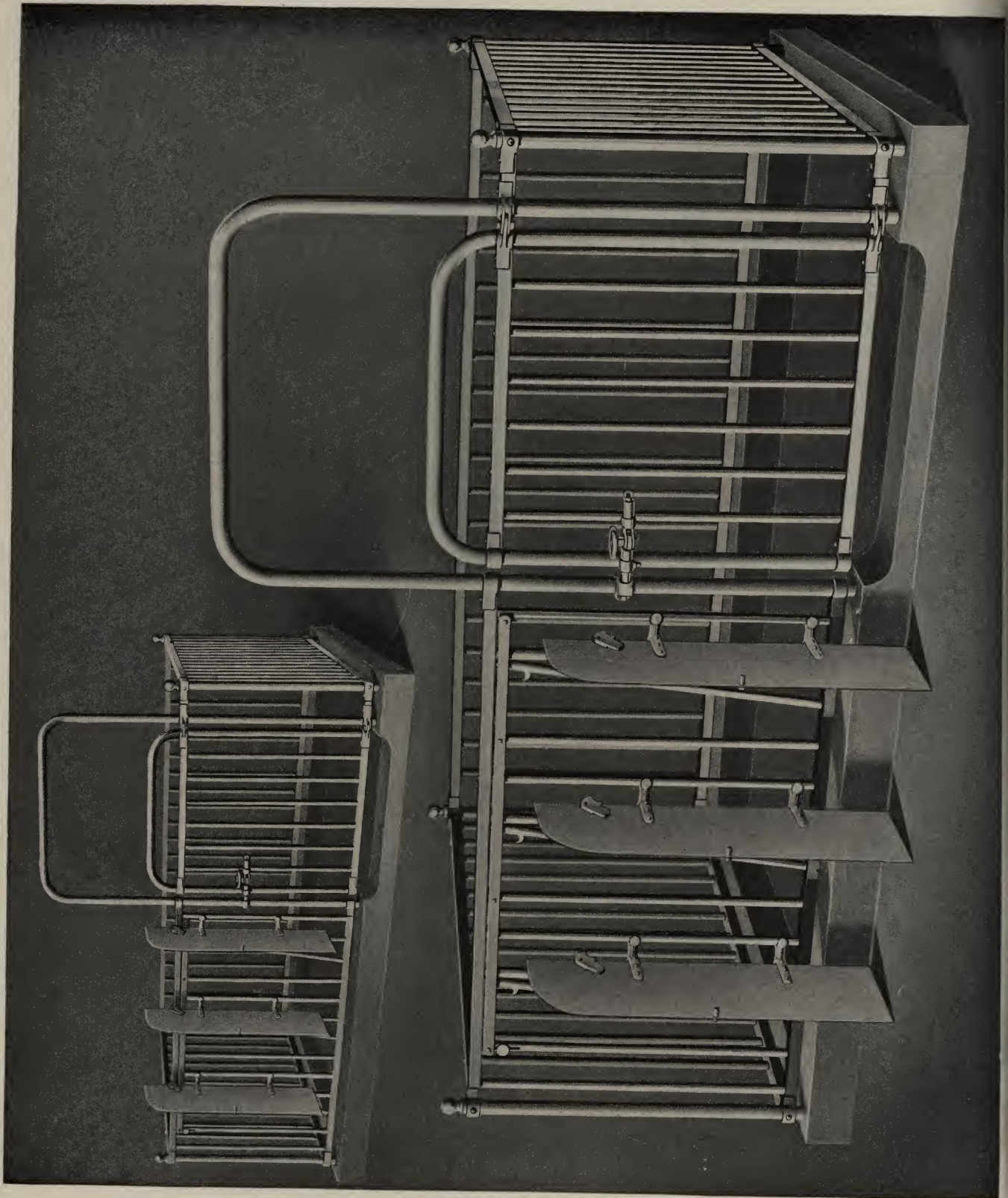
When the stanchion is closed each bar is held fast at the top by a simple gravity lock which locks automatically as the bar is slammed shut.

The neck space of the stanchion can be widened simply by putting the bolt in the lower end of either bar through adjustment holes that are provided for that purpose.

The bars of this stanchion are made of high carbon steel U-bars completely filled with the kiln-dried hard maple lining considerably stronger than any 1½-inch pipe or tubing.



No. 979—Open



No. 632 Star Steel Calf Pen

EVERY careful breeder, dairyman and herdsman knows that the ability and productive value of the mature cow depends largely on the treatment and care the animal gets while young. Many calves are lost each year from causes which might easily be avoided.

For calves to grow successfully they must be comfortably housed in clean, sanitary surroundings and have plenty of fresh air and sunshine.

The Star Steel Calf Pen is strong, sanitary and of few parts. It offers the least possible obstruction to light and ventilation.

The top and bottom rails are of $1\frac{1}{2}$ -inch O. D. square steel tubing. The corner posts are of $1\frac{5}{8}$ -inch steel pipe. The uprights and stanchions are of $1\frac{1}{2}$ -inch O. D. steel pipe set 5 inches O. C. The ends of the uprights are inserted into the top and bottom rails, dispensing entirely with the use of clamps and leaving the rails absolutely smooth.

Each panel or section is assembled at the factory. The corner posts and the legs of the gate arch are all that need to be embedded in cement.

The gate is hung on offset hinges which allow it to swing back flat against the pen when open.

The gate is fitted with an extra heavy spring lock. It locks automatically and cannot possibly be opened by accident. The gate opening is 3 feet 3 inches wide.

Stanchions are built into calf pens, as desired.

By means of a continuous locking bar they can all be

opened or closed at one time; or opened and closed separately, as desired. This bar and all connections are below the top rail.

Feed guards of heavy steel, 12 inches wide and 41 inches high, are so arranged that they can be raised when the manger trough is to be cleaned. These feed guards prevent the calves forming the habit of chewing or sucking each other's ears.

Star Steel Calf Pens are assembled in panels or sections of any desired length, finished in gray enamel.

Gate fittings for Star Steel Calf Pen include double arch, hinges and automatic safety lock. Star Steel Calf Pen may be fitted with stanchions spaced either 15, 20 or 25 inches apart on center. Star Steel Calf Pen, height, Panel 3 feet 9 inches from the pen floor; finished in gray enamel; weight, per foot, 15 lbs. Star Feed Guards for Calf Pen, finished in gray enamel; weight, each, 20 lbs.



STAR Equipped Calf Barn on Wheatfield Farms
Owned by J. C. Dold, Buffalo, N. Y.

No. 813 Star Steel Young-Stock Pen

NO barn is properly equipped unless provision has been made for the proper housing of the young stock.

STAR Steel Young-Stock Pen was designed to take care of large calves, yearlings, or even full grown cows. This pen is built the same height as STAR Steel Cow Pen. The top and bottom rails are made of $1\frac{1}{2}$ inch square steel tubing into which the ends of the upright bars are inserted. The upright bars are made of $1\frac{1}{8}$ inch O. D. steel pipe, new and tested, and are spaced 5 inches apart on centers. Long, heavy tie rods extending through the uprights bind the panels together as rigidly as though they were made of one piece. It has smooth top and bottom railing, free from clamps, and is easy to clean and to keep clean.

Stanchions are spaced 30 inches apart

on centers, unless otherwise specified. While these stanchions are intended primarily for young stock they are plenty strong and heavy enough for full grown cows. The uprights are made of $1\frac{1}{4}$ inch by $1\frac{1}{4}$ inch high carbon steel U-bars filled with kiln-dried hardwood linings attached to the top and bottom railings by malleable clamps arranged to provide an adjustment in neck space.

When ordering or writing for quotation, send along a rough sketch showing the measurements, the location of the gates and specify the number of stanchions required as this construction is built to order.

The STAR Steel Young-Stock Pen is 4 feet 8 inches high from floor. Finished in gray enamel. Average weight per foot, 20 lbs.

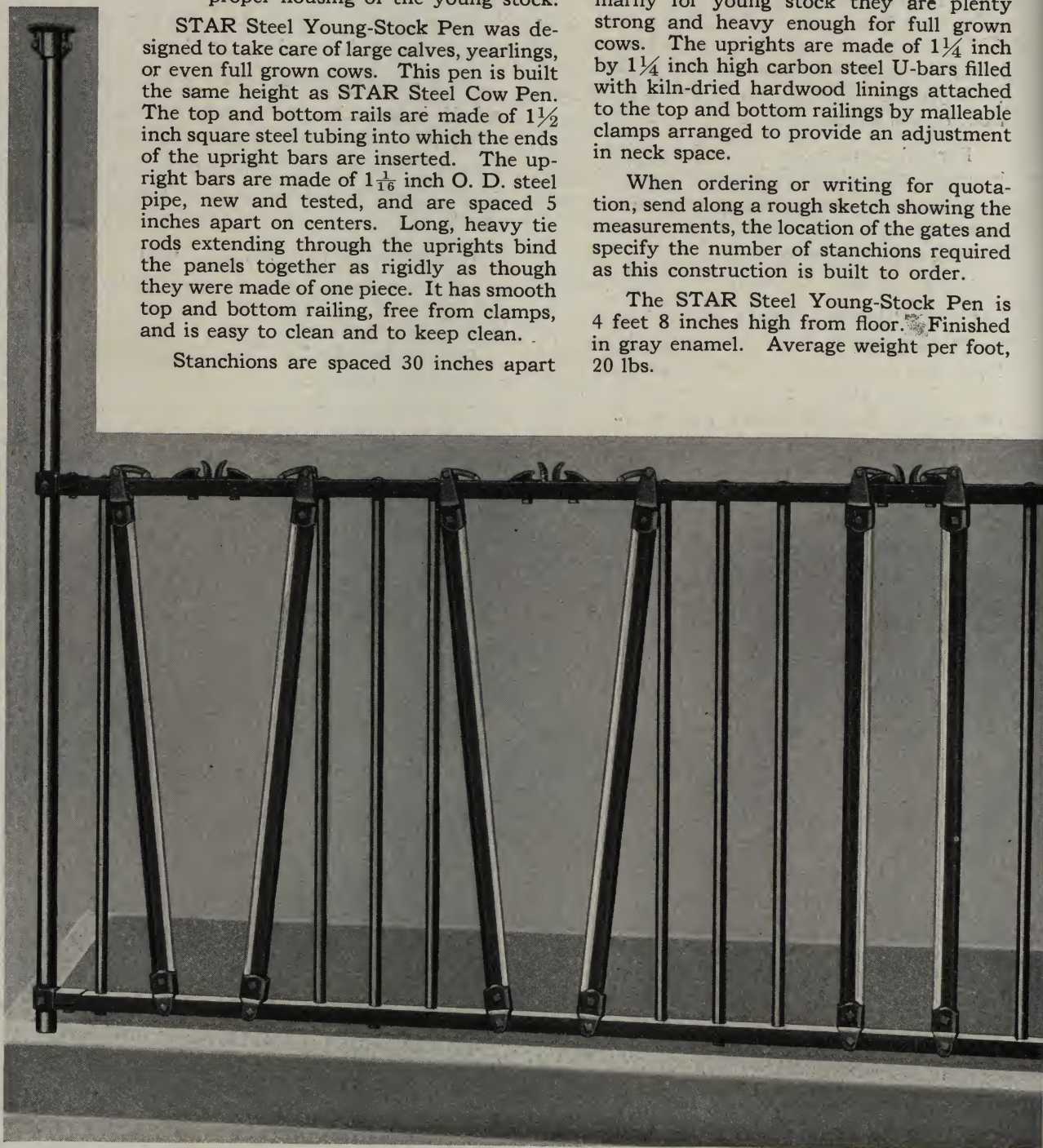


Fig. 813—STAR STEEL YOUNG-STOCK PEN
Assembled in Panels Before Shipment

No. 726 Star Steel Hog Pen

AFTER STAR equipment is once installed, it will quickly return its cost. In the first place, of course, it enables the pens to be easily and quickly cleaned. Owing to the fact that it offers no obstruction to the vision of the hogs it keeps them in a more contented state.

Fumigation and disinfection are really efficient in STAR Steel Hog Pens.

On the principle that the early hog is the most profitable, hograisers everywhere are now beginning to devote serious attention to the question of properly housing pigs for winter farrowing.

Extra Strong—Simple Construction

The STAR Steel Hog Pen is strong, sanitary and has few parts. The top and bottom rails are of 1½-inch O. D. square steel tubing. The corner posts and gate arches are of 1⅝-inch O. D. steel pipe. The uprights are 1⅛-inch O. D. steel pipe, regularly set 4 inches apart on center.

The ends of the uprights are inserted into the top and bottom rails, eliminating entirely the use of unsightly and unsanitary clamps and leaving the rails as smooth as a banister.

Every panel or section is completely assembled at the factory. The corner posts and the legs of the gate arch are all that need to be imbedded in the concrete.

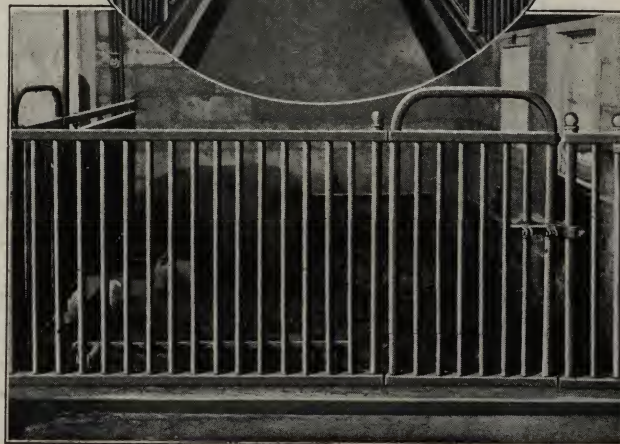
The STAR Hog Pen Gate, like all STAR gates, is hung on offset hinges, which allow it to swing back flat against the pen when opened. Every gate is fitted with an extra heavy spring lock, which locks automatically. This lock is operated by a round knob and cannot possibly be opened by accident. The arched construction of the gate itself absolutely insures it against sagging. The arch over the gate, which binds the panels together, insures perfect operation of the gate and aligns it accurately.

The Farrowing Rail prevents the sow from lying too close to the cement curb or pen panel, and affords a means of protection as well as escape for the little pigs.

This Rail, which extends around the pen, is hinged from the pen uprights and during farrowing time is lowered into position. When raised, it is locked automatically and held in place so that it occupies no pen room.

STAR Hog Pens are made up in panels or sections of any desired length. When ordering or requesting quotations, send a rough sketch with measurements.

STAR Steel Hog Pens 3 feet 9 inches high from the pen floor, with uprights 4 inches apart on center, finished in gray enamel.



Light, Ventilation and Cleanliness are Three
BIG Features in STAR Hog Pens

No. 1273 Star Steel Hog Pen

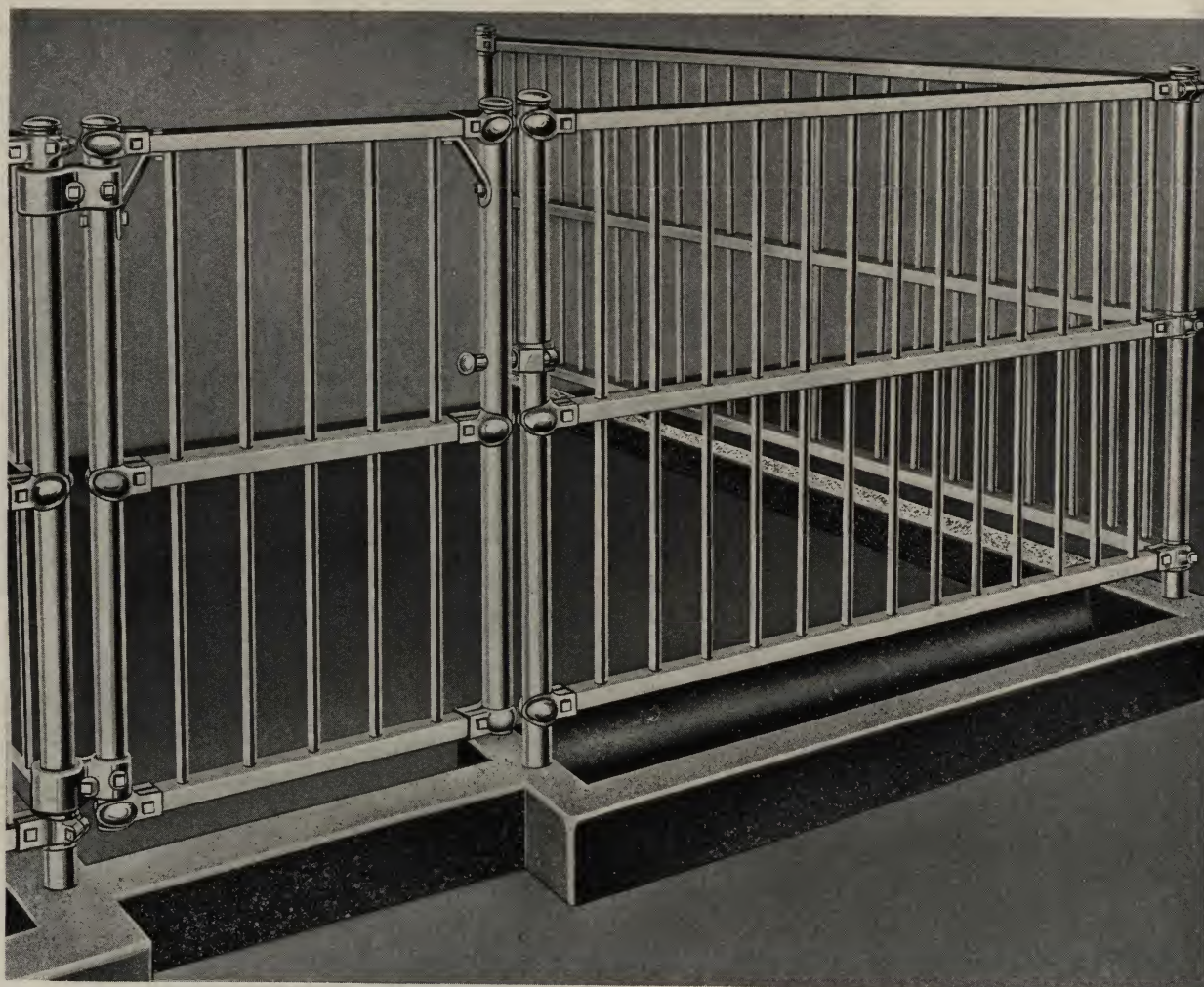


Fig. 1273—STAR STEEL HOG PEN

THIS Hog Pen is made with 1-inch by 1½-inch rectangular top rail, bottom rail and intermediate rail. The spindles are ½ inches in diameter and set 4 inches apart on center.

The gate post and corner post are of 1⅝-inch O. D. pipe.

Every fifth spindle passes clear through top and bottom rails. It has a smooth rounded head on top and is threaded at the bottom. A nut on the bottom end is turned up tightly and holds the panel strongly and solidly together.

Where the rails join the posts, they are held in place by strong malleable clamps. The bolts which fasten these clamps pass through the ends of the rails, holding them securely so there is no danger of the rail slipping out of the clamp.

The gate is built to match the panel. It turns on the gate post itself so that there are no hinged parts projecting into the opening when the gate is open.

No. 1273 Hog Pen measures 3 feet 9 inches from the floor. It is finished in gray enamel, baked on. Weight, 16 lbs. per foot.

No. 1290 Star Steel Hog Pen

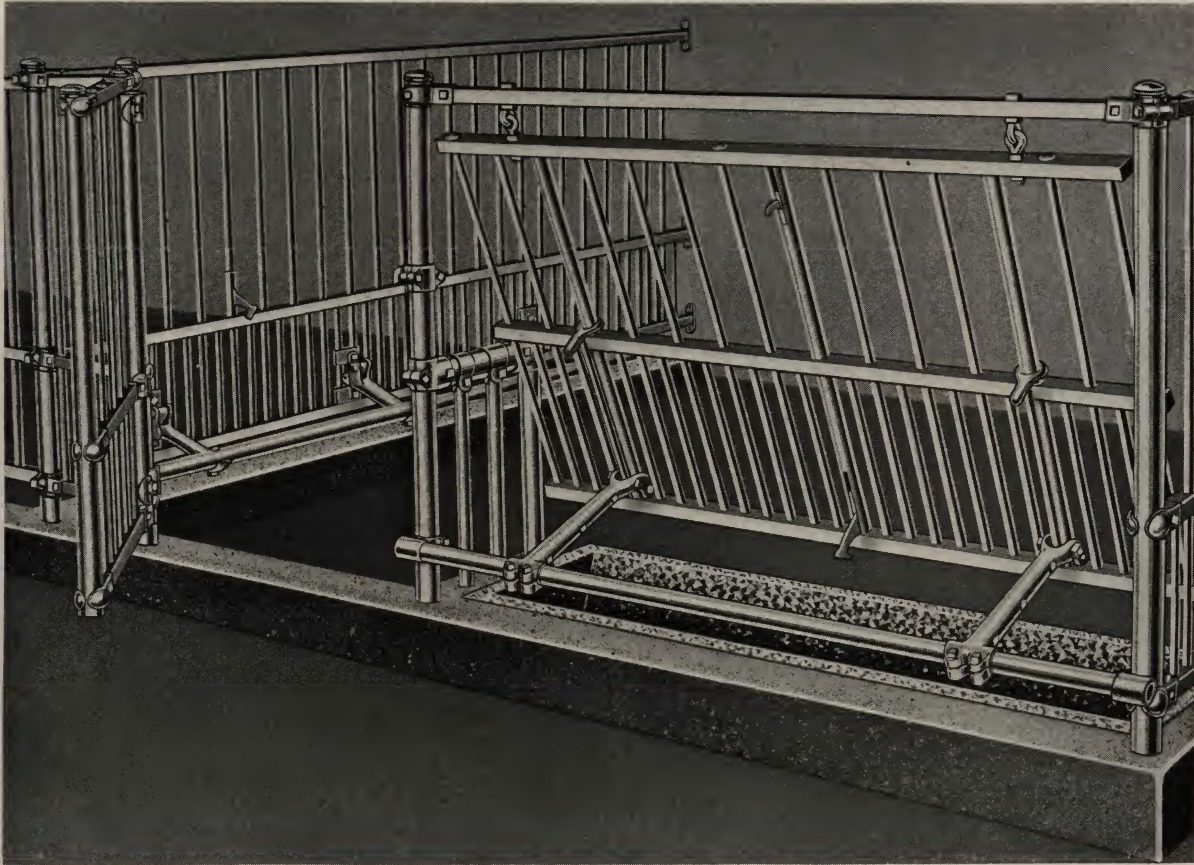


Fig. 1290—STAR STEEL HOG PEN

THE No. 1290 Star Steel Hog Pen is built with $1\frac{1}{2}$ -inch by 1-inch rectangular top, bottom, and intermediate rails with $\frac{1}{2}$ -inch spindles placed 4 inches apart on center. It is in all respects just like the No. 1273 Hog Pen shown on the preceding page except that the intermediate rail is placed 1 foot above the bottom rail and short spindles are placed between the long spindles in the lower section of the pen panel. This spaces the spindles in the lower panel 2 inches apart, which prevents young pigs from getting out of their proper pens.

The farrowing rail which can be seen through the open gate in the illustration may be placed on all sides of the pen, if desired. Attachments are furnished to fasten the farrowing rail to the back wall. This farrowing rail provides protection for little pigs. When the farrowing rail is lifted, it hooks up out of the way, making more room in the pen.

The swinging front panel shown with the No. 1290 Pen swings back to keep animals out of the trough while it is being filled. A simple latch trigger is released to let it swing forward after the trough is filled. The swinging front panel automatically locks into either vertical or slanting position.

A concrete feed trough can be used instead of the metal trough shown in the illustration.

The No. 1290 Hog Pen measures 3 feet 9 inches high above the floor. It is finished in gray enamel, baked on, and weighs 17 lbs. per foot.



Special Fittings for Star Pens

ALL STAR Pens, including bull pen, cow pen, young stock pen, calf pen and hog pen can be made to fit practically any barn arrangement or condition. The illustrations on this page show a very few of the many ways that Star Pen Panels can be made to conform to unusual arrangements.

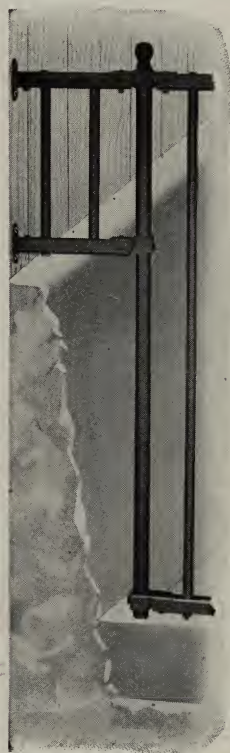


Fig. 972

When the foundation wall is irregular in shape or thicker than the wood sill which rests on it, an arrangement like that shown in Fig. 972 is used. This can be varied to suit any irregularity in the wall construction.

When panel ends against masonry wall it is usually more satisfactory to run the end post up to the ceiling and fasten it with a flange at the top as shown in Fig. 974.

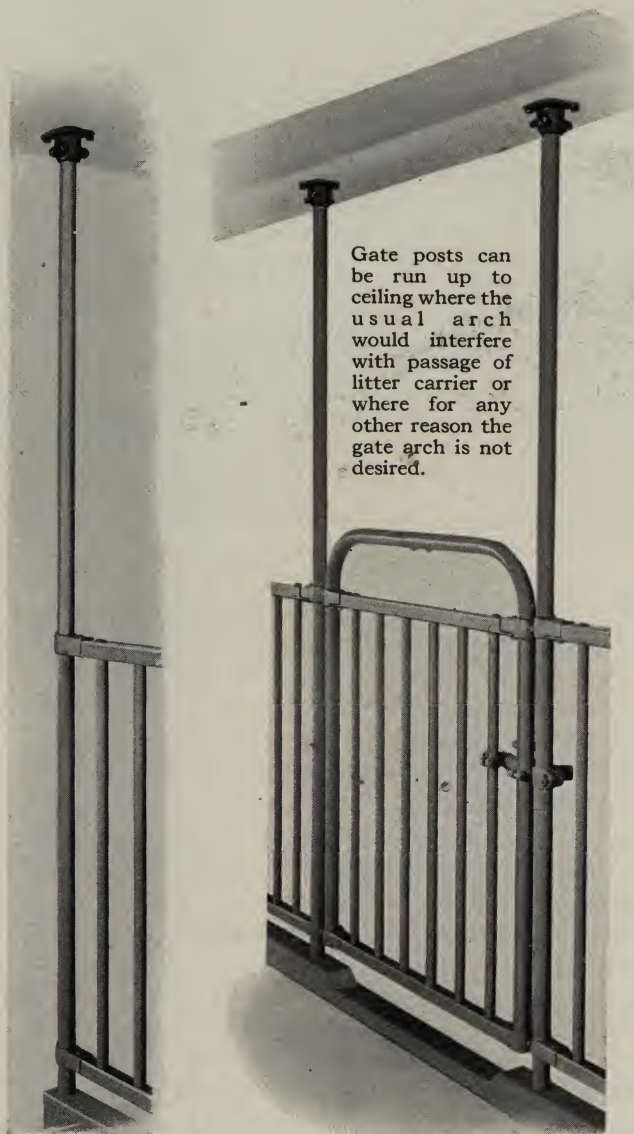
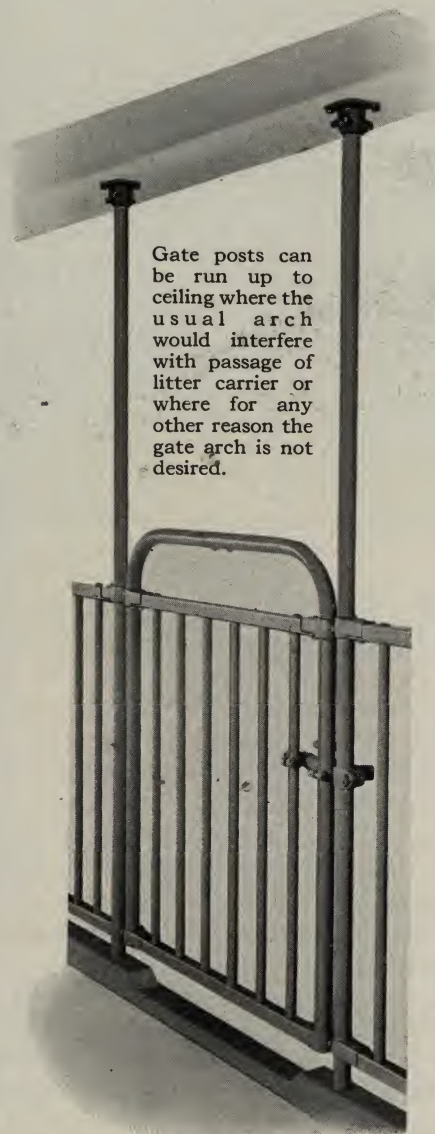


Fig. 974



Gate posts can be run up to ceiling where the usual arch would interfere with passage of litter carrier or where for any other reason the gate arch is not desired.

Fig. 975

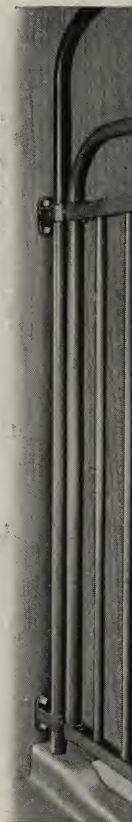


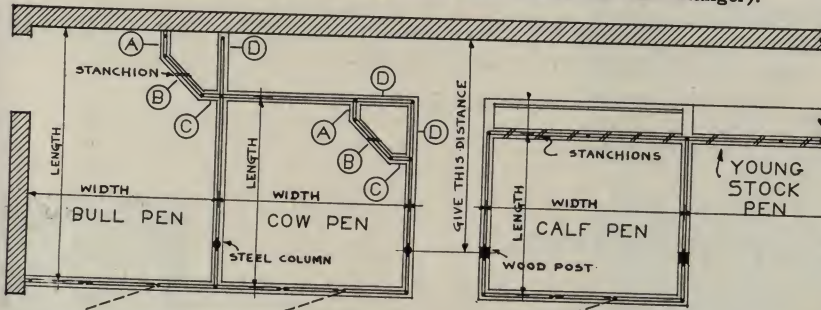
Fig. 973

Where the pen panel ends at a wooden wall or partition, the ends of top and bottom rails are fitted with flanges so that the end of the panel is firmly held by lags screwed into the wall.

It is Easy to Order Star Pens

YOUR ORDER SHOULD GIVE THE FOLLOWING NUMBERED INFORMATION:

1. Number of feet of each kind of pen panel (see example below).
2. Number of sets gate fittings for each kind of pen panel (one set for each gate).
3. Number of stanchions for each kind of pen panel.
4. Number of sets of triangular manger uprights (one set for each manger).



EXAMPLE:—What will be the amount of pen footage for a bull pen located as indicated on sketch the width being 10 ft. and the length being 13 ft.?

SOLUTION:—(1) To figure number of feet of panel add the length up to the manger, which will be 10' 0", plus the width of 10' 0", plus the full height manger panel (A+B+C) of 5' 0" (see dimension of triangular manger below). This gives a total of 25' 0" of bull pen panel.

5. Number of feet of low manger rail.
6. Number of Column Clamps (two for each column).
7. Number of wood wall or wood post flanges (four for each post—for wall flanges see F-1 and F-2 below).
8. Number of feet 1½" O. D. end posts and number of split flanges where panel ends at a masonry wall—figure number of feet above top of panel to ceiling for each panel that ends at this type of wall. Where gate posts extend to ceiling no extra charge is made. (See description of pens for panel height.)

NOTE:—In figuring pen footage the gate opening is figured as panel; extra charge for gate fittings is made.

- (2) One set gate fittings.
- (3) One built-in stanchion.
- (4) One set triangular manger uprights.
- (5) Three feet low manger rail (D). (To figure low manger rail consider the length of each low side of the triangular manger as 3').
- (6) Two column clamps.
- (7) Two wall flanges (see F-2).

A SKETCH MUST ACCOMPANY EVERY ORDER COVERING PEN MATERIAL

- A.—Indicate on sketch—Location of pens, width of pens, length of pens. These measurements should be from wall to center of pen panel or center to center of parallel panel.
- B.—Locate triangular corner manger if any in bull or cow pen.

DIMENSIONS OF TRIANGULAR MANGER

See sketch above—"A" measures 12"; "B" measures 3' 0"; "C" measures 12", or a total of 5' 0" of full height panel. "D" measures 3' of low manger rail or manger gate in all standard size mangers.

- C.—Locate gates and show which way to swing—do not swing gates into pen or back against any door opening unless absolutely necessary.

DESCRIPTION OF STAR STEEL PENS

Kind	Actual Panel Height	Panel Height Installed	Width of Gate Opening Center of Uprights	Spacing of Fillers Center to Center	Outside Diam. of Fillers
Bull.....	64"	62"	4' 4"	6"	1½"
Cow.....	48"	56"	3' 4"	5"	1½"
Young Stock.....	48"	56"	3' 4"	5"	1½"
Calf.....	37"	45"	3' 4"	5"	1½"
Hog.....	37"	45"	2' 6"	4"	1½"

- D.—Locate stanchions in cow and bull pen if no triangular manger is wanted, locate where stanchions are to be placed in calf pen or young stock pen.

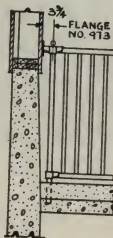
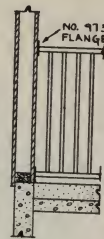
SPACING OF CALF STANCHIONS

No. of Stanchions	15" O.C.	20" O.C.	25" O.C.	No. of Stanchions	15" O.C.	20" O.C.	25" O.C.
1	2' 1"	2' 1"	2' 1"	5	7' 1"	8' 9"	10' 5"
2	3' 4"	3' 9"	4' 2"	6	8' 4"	10' 5"	12' 6"
3	4' 7"	5' 5"	6' 3"	7	9' 7"	12' 1"	14' 7"
4	5' 10"	7' 1"	8' 4"				

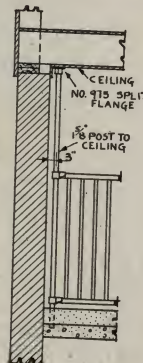
- E.—If wood post or steel column comes in line of panel, give size of post or column, give exact location of post or column from walls each way, measure to center of post or column from face of wall.

F.—State what type of wall construction if panel ends at wall.

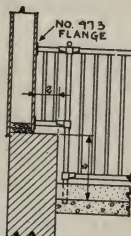
- (1) If walls are of wood then both bottom and top rail of panel can be attached direct to wood wall with two No. 973 wall flanges.



- (2) If wall is part masonry and wood above then a regular pen post is furnished with top rail of panel flanged to the wood portion of wall, with one No. 973 wall flange. (See description of pens for panel height installed.)



- (3) If masonry wall extends above top of panel then a 1½" O. D. end post extends to ceiling and a No. 975 split flange is used.



- (4) If masonry wall has an offset then a short piece of low panel is furnished as illustrated. Give height and width of projecting wall.



No. 952 Star All Metal Milk Stool

THIS is one of the little things around the barn that comes in mighty handy. It is sturdy and secure in its footing, and so durable in construction that it should last practically forever.

It is perfectly sanitary because it is constructed entirely of metal.

Rim is deep enough and stool is so balanced that it can be carried about by simply catching the finger tips under the rim.

The Star Milk Stool is finished in gray enamel.

Weight, each, 4 lbs.

Star Gray Enamel

HERE is an enamel that will protect metal from rust and barn conditions. It is exactly the same composition that we use on STAR Equipment and has been thoroughly tested out for several years under the most trying conditions possible with the result that it has been found to give *lasting service*. It is rust-resisting and withstands ammonia and gases found in a dairy barn.

It is elastic enough to take care of the expansion and contraction of the steel on which you use it without cracking or chipping.

Furnished in one-half pint, pint, quart and gallon cans.



Fig. 759



Fig. 637

No. 637 Star Manger Drain

AN Absolute Necessity in every Sanitary Barn. If the mangers of the dairy barn are made of cement, they should be equipped with Star Manger Drains. Every floor that is flushed with water should be so built that the water is carried off through a Star Drain.

The body is of cast iron. Ordinary drains have iron or brass caps that rust and corrode, causing them to stick. The cap of the Star Drain is made of aluminum, a metal that doesn't corrode or rust, and is machined to make a close-fitting joint.

The Star Manger Drain complete, 4 inches in diameter, weighs 6 lbs.

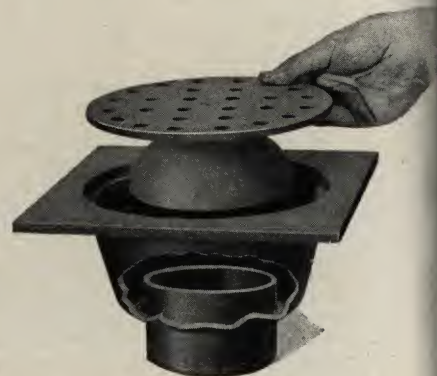
No. 1070 Star Bell Trap Drain

STAR Bell Trap Drain is made of high quality cast iron. The outlet is for a 4-inch tile or pipe and the face or surface which is to set flush with floor or bottom of the gutter measures 9 inches square.

The illustration shows the principle of operation, the construction being such that solid matter is prevented from passing into the outlet and clogging it, and gases and odors are prevented from backing up.

The depth of the bell makes it an ideal drain to be used when flushing the gutter of a barn.

Weight, each, 12 pounds.



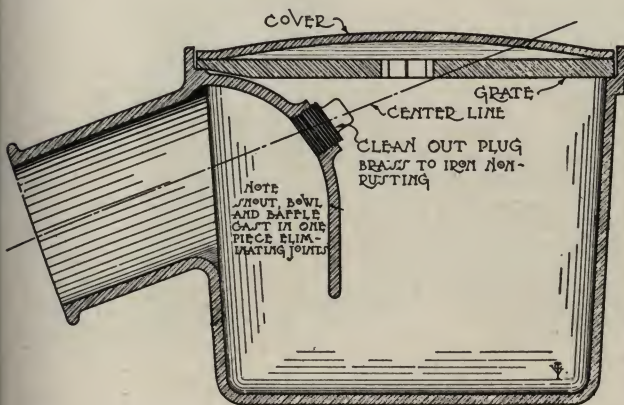
No. 442 Star Water Seal Drain

THE Star Water Seal Drain applies the well known water seal principle to prevent sewer gas from backing up into the building.

The fact that the bowl, baffle plate, and the neck are all cast in one piece has a very decided advantage because it eliminates any possibility of gas escaping through a leaky connection or seam between the neck and the bowl part of this drain.

The bowl part of the drain measures 8 inches by 12 inches and is 9 inches deep. This provides a sediment trap of large capacity which will not fill up very rapidly. It is easy to get at and can be cleaned in a jiffy. The neck is for a 4-inch pipe.

It has two covers—a heavy grill cover and a solid cover plate as shown in the upper illustration.



The sectional view shows the one-piece construction of bowl, baffle plate, and neck as well as the grate and cover.

It also indicates the handy and convenient location of the clean-out plug through which a rod may be inserted.

This plug is made of brass which, screwed into the iron baffle plate, will not rust.

Weight each, 42 lbs.



Fig. 724

No. 724 Star Steel Bull Staff

USE a STAR Steel Bull Staff and be protected against accidents when handling the bull. Every good feature found in any Bull Staff, together with exclusive STAR advantages, are found in our product.

The STAR Bull Staff can be operated from two places. When hooking the staff into the bull ring, the snap can be opened from the hook end. When releasing the staff from the bull ring, the snap on the hook can be opened from the handle end.

It gives perfect control over the bull in the same manner, only more efficiently, than a Curb Bit handles a horse.

A pressure of the sharp points of the barbed head against the animal's nose or a slight turning of the staff keeps him well under control at all times, no matter where you are standing.

The STAR Bull Staff is 5 ft. in length.

The hook and handle are constructed of very best malleable iron, while the staff itself is made of 1-inch steel pipe and is absolutely and positively indestructible.

Finished in gray enamel, thoroughly baked on.

The weight is 7½ lbs.



Fig. 817

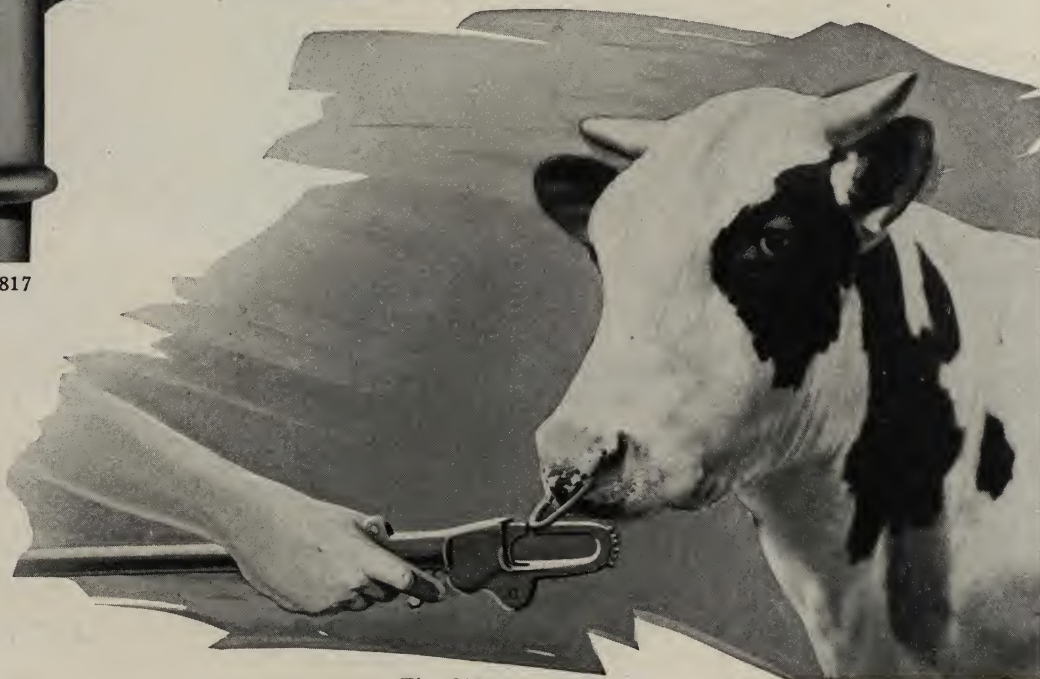


Fig. 818

The STAR Bull Staff is operated as illustrated or by the chain extending through the staff from hook to handle

Cork Brick

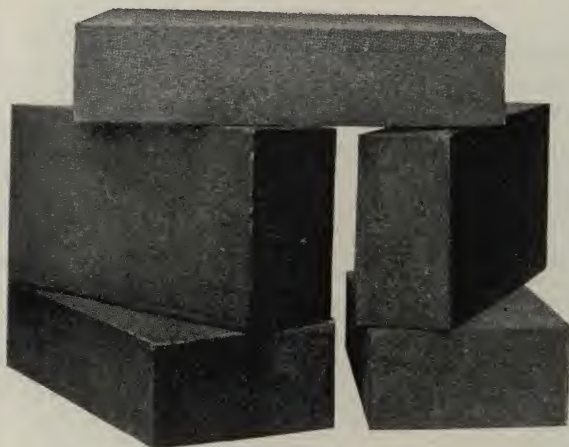


Fig. 638

CORK BRICK is made of particles of cork held together by refined asphalt, and moulded into bricks four inches by nine inches by two inches thick.

They are waterproof and non-absorbent.

Standing or lying on the cold, hard surface of concrete is so injurious to the stock that it more than offsets the easy-to-keep-clean qualities of a concrete floor. Cork Brick is the modern solution. It offers all of the following advantages that are essential to a successful floor:

- | | |
|------------------------|--------------------------------|
| (1) Sanitary— | (4) Noiseless— |
| (2) Warm to the touch— | (5) Never slippery— |
| (3) Easy under foot— | (6) Durable in service— |
| | (7) Extremely easy to install— |

Size of Cork Brick is nine inches by four inches by two inches.

The bricks are laid flat and four will cover exactly one square foot of surface.

Weight of Cork Brick is 2 3-5 pounds each.

Ten thousand seven hundred bricks make a minimum carload of 30,000 pounds. Small lots must be crated.

Samples furnished on request.

Creosote Blocks

CREOSOTE BLOCKS provide a most satisfactory floor for horse stalls and hog pens and are preferred by many for use in dairy barns, not merely because they protect the animal from the harsh surface of bare concrete but because of their long-wearing qualities.

The creosote blocks we furnish are made of dense, southern yellow pine, square edged and sound, free from bark, loose knots or other defects detrimental to strength or durability. They are very close grained and so cut that the wear comes on the end of the grain.

These blocks contain 10 lbs. of preservative per cubic foot. The preservative is genuine creosote oil—the kind that is adopted as standard by the American Wood Preserving Association and conceded by architects and engineers as being vastly superior to any of the sub-standard imitations which, in many cases, are like genuine creosote oil only in appearance and, as a preservative, are but slightly more effective than a thin, dark stain.

Two-inch blocks, for piggeries and cow stalls, weigh 74 lbs. per square yard.

Three-inch blocks, for horse stalls, weigh 112 lbs. per square yard.

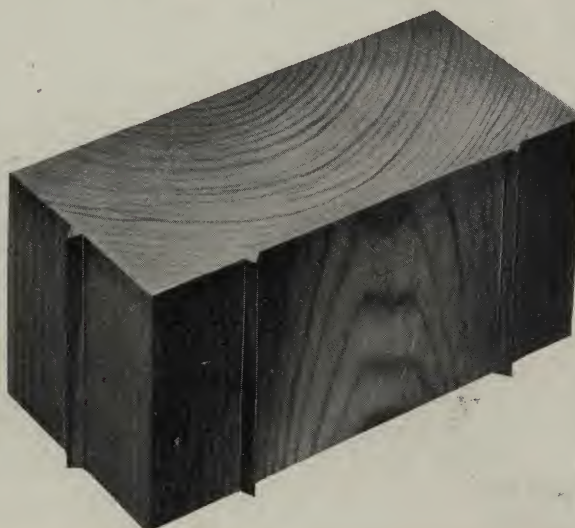




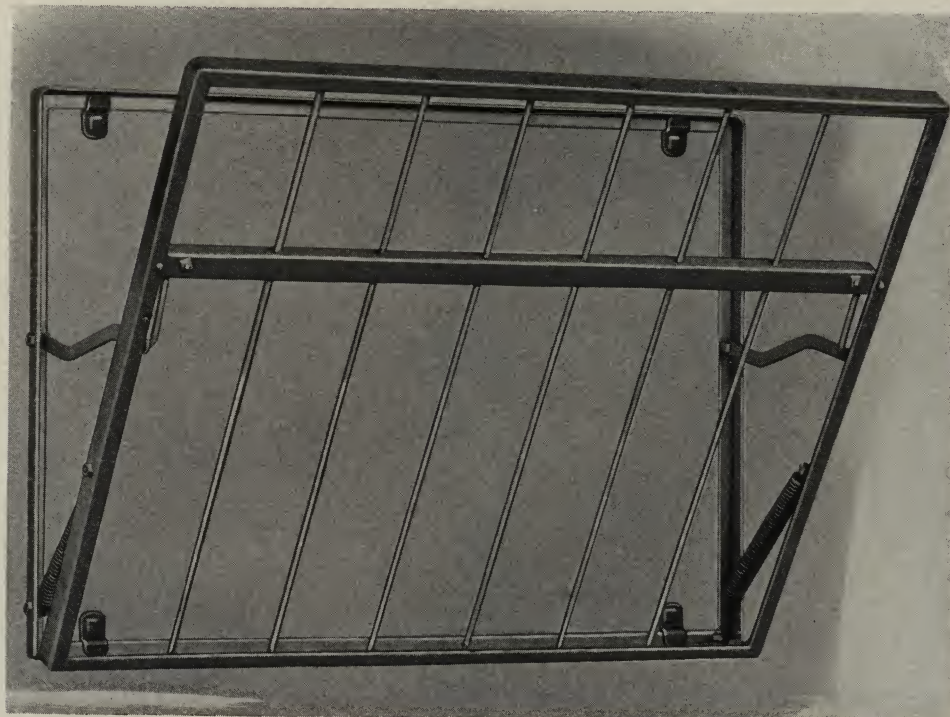
Fig 761

STAR HORSE STALL

Fitted with Open Back Automatic Hay Rack, Sanitary Feed Manger and Steel Stall Guards

Star Automatic Steel Hay Rack

(Open Back Construction)



STAR Automatic Steel Hay Rack can be instantly locked open and quickly filled with hay. It locks open automatically. When released the front closes automatically. A spring pressure holds the hay at an even tension. It permits the animal to feed right down to the last spear of hay without wasting a particle. Saves 3 lbs. to 5 lbs. of hay daily.

It is perfectly sanitary; permits easy and effective ventilation and disinfection. It abolishes entirely the eating of trampled, dirty, unfit feed.

It saves stall room and floor space.

Frame work $1\frac{3}{8}$ -inch by $\frac{7}{8}$ -inch high carbon steel angles. Corners rounded and reinforced. Cross bars are steel angles. Rods 6 inches apart welded to cross bars and frame.

Four heavy steel lugs offset to fit over angle of frame are fastened to wall with bolts or lags as illustrated above.

The open back rack illustrated on this page is attached to wall or partition as illustrated. Can also be furnished with upright rods in back for front alley feeding as illustrated on the next page. Made in the following sizes:

	Hgt.	Wid.	Wgt.
	In.	In.	Lbs.
No. 1510 Standard.....	36	42	40
No. 1511 Standard.....	36	48	45
No. 1512 Special.....	36	36	37
No. 1513 Special.....	30	54	44

Back is 30 inches high.

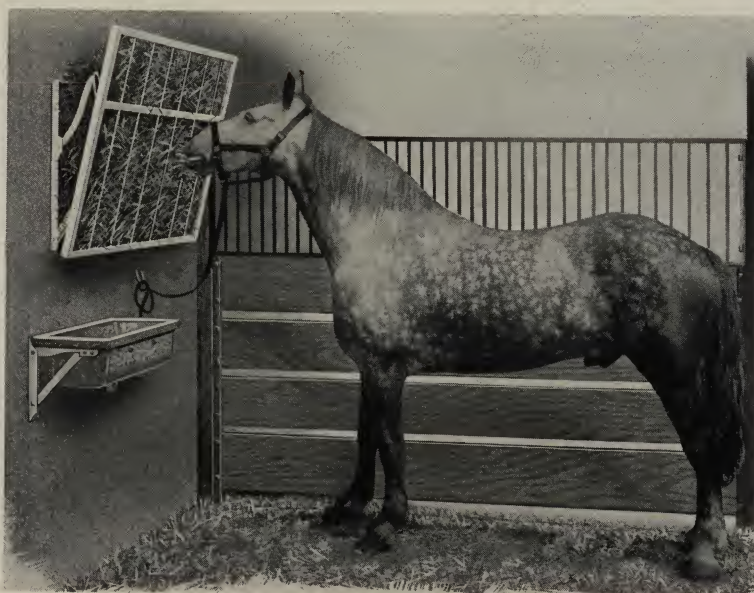




Fig. 760—STAR HORSE STALL

Fitted with STAR Stall Front, Automatic Hay Rack, Sanitary Feed Manger and Steel Stall Guards described on the following pages

Star Horse Stall Front Used with Automatic Hay Rack

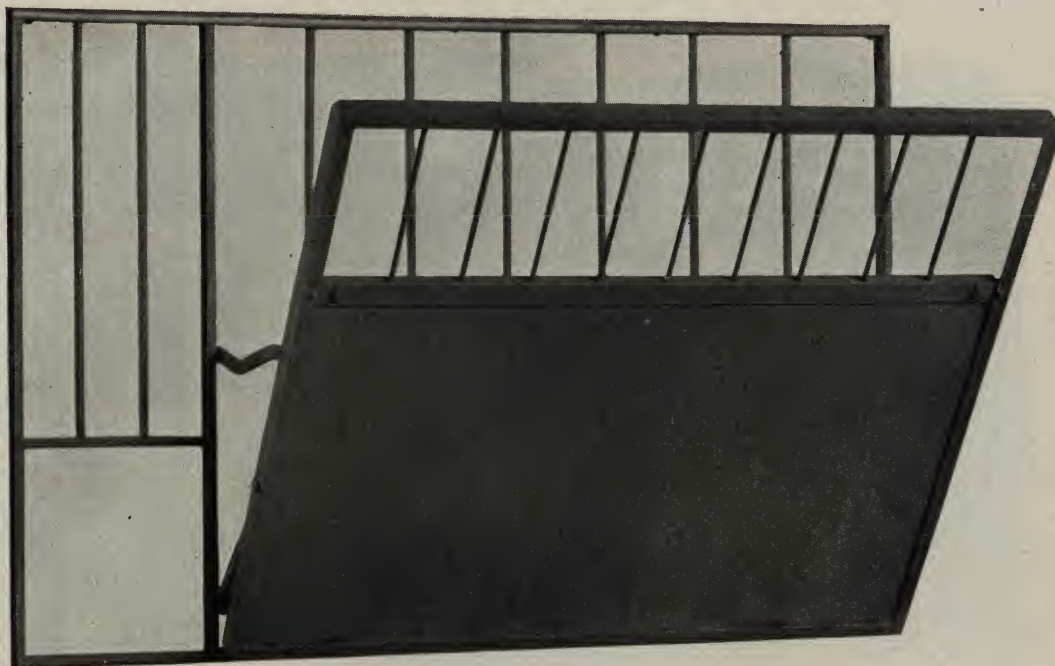


Fig. 749

STAR Stall Front with Automatic Hay Rack locked open, as it appears from front feeding alley

THE Star Stall Front is designed for front alleyway feeding. It fills the entire opening or stall front, fitting in neatly between the front stall posts. This construction is designed to do away with all wooden parts, as the stall front itself supports the Automatic Hay Rack and fills the entire opening with the exception of the space through which the grain is fed from the front alley.

The upright rods are spaced 6 inches apart on center, so that the horse can reach the hay easily; at the same time the automatic rack constantly holds the hay under spring pressure, keeping it within easy reach and at the same time prevents it being pulled out in bunches and wasted.

The front of the rack is locked open to be filled and then released so that it occupies, even when full of hay, very little alley room.

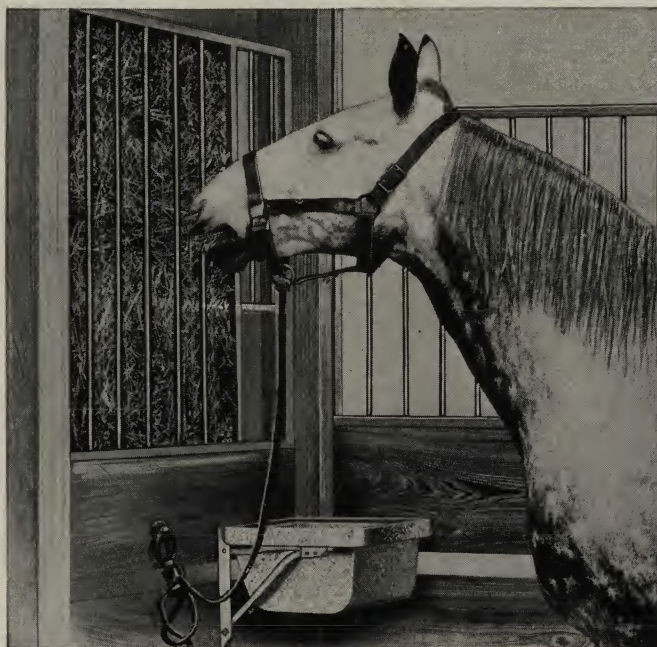
The saving in hay alone, without considering any of the other good features of this rack, will pay the initial cost of installation in six months' time.

When ordering, it is only necessary to specify the exact space in between the wooden posts to which the Star Stall Front is to be attached.

Holes are provided in frame to fasten the front with bolts or lags.

The Star Stall Front with Automatic Hay Rack combined, is assembled before shipment and is nicely finished in gray enamel.

No. 749 Stall Front, 54 inches wide. Weight, each, complete, 85 lbs.



No. 1523 Tilting Stall Front



THE operation of this tilting stall front is clearly shown in the illustration above. It can be operated and locked open or quickly released and closed with one hand from either side.

It is automatically locked in place at both ends when either open or closed.

The bottom of the opening is 20 inches wide which provides plenty of room to put hay in the manger below the opening without danger of the hay being thrown back over the top of the manger and into the stalls and wasted.

It can be opened part way with one hand while the grain is being put in the feed box with the other.

The frame is made of heavy steel channels welded at the corners with the top and side channels covered to make a nice smooth, dust-proof job.

The vertical uprights are one-half inch rods placed $4\frac{1}{2}$ inches apart on center.

It measures 3 feet high and can be furnished any width to fit the stall, the standard width being designed for 54-inch opening.

Suitable holes are provided in the steel brackets so that the tilting front can be attached to steel or wood posts with bolts or lags.

This tilting stall front can also be provided with bolts and clamps to fasten to 4-inch steel columns instead of the 6 x 6 wood posts shown in the illustration.

The simplicity of construction and operation will appeal to the horse owner as well as its rugged strength and the fact that there are no wearing parts.

The drawing below shows the No. 1523 Tilting Stall Front used in connection with typical horse stall. As indicated in this illustration the tilting front is mounted above and in line with the planks which form the front of the stall and manger. These planks run up 3½ feet which brings the top of the

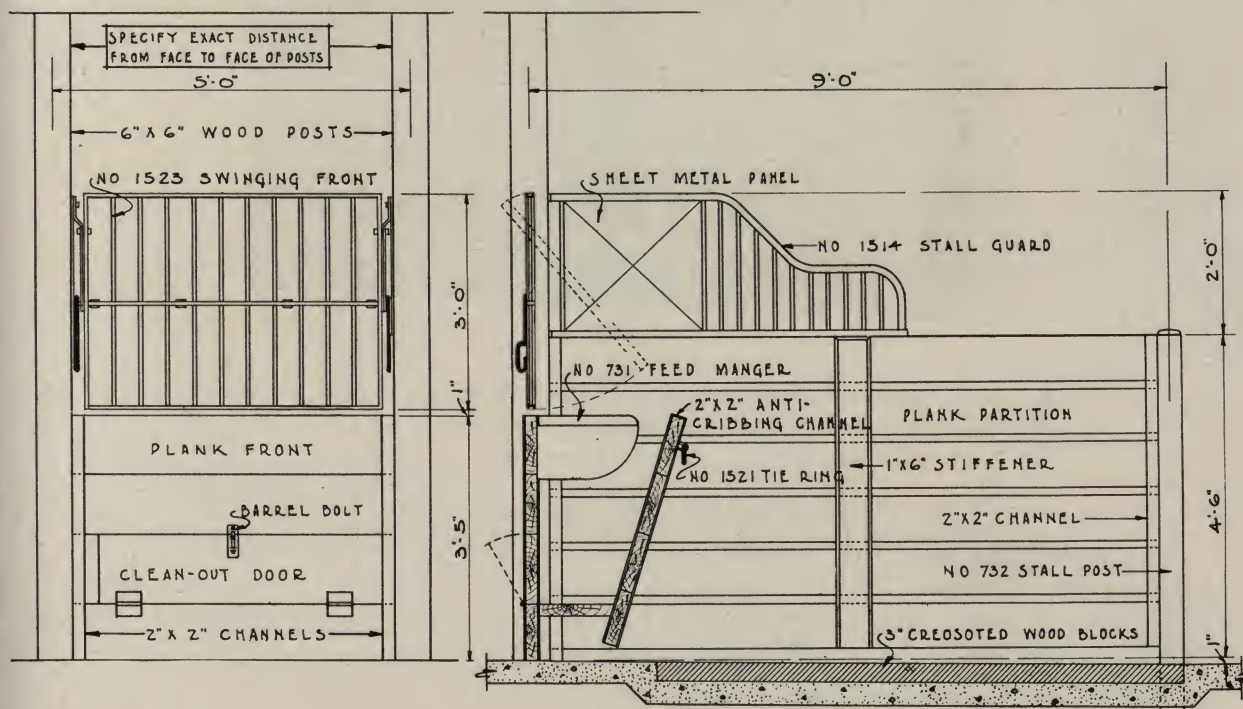
swinging front 6½ feet above the floor—the most desirable height for a horse stall partition.

The drawing also indicates the relative height of the tilting stall front and the stall guards which are mounted on the top of a 4½ foot plank partition which separates one from stall another.

Stall guards of several different types of construction are shown on pages that follow and are made with rounding ends of any desirable length or with square ends extending the full length of the partition as indicated by the dotted lines.

No. 1523 Tilting Stall Front, 54 inches wide, 36 inches high, weighs 57 lbs.

No. 1523A Tilting Stall Front, 54 inches wide, 24 inches high, weighs 40 lbs.



Typical horse stall showing tilting front, manger, feed box, tie ring, stall guards, stall posts and steel channel to hold planks.

The dimensions shown can be varied but are generally regarded as standard horse stall dimensions.



No. 1518 Steel Window Guard



THE Window Guard shown here is made with a heavy steel channel rail at top and bottom with $\frac{1}{2}$ -inch vertical steel rods spaced $3\frac{1}{2}$ inches on center.

The illustration shows one in use in a window approximately 30 inches square, but they can be made to fit windows of any size.

They are fastened to the window frame with heavy screws and effectively prevent glass from being broken.

Finished in gray enamel.

No. 1518 Steel Window Guards, weight, per sq. ft., 3 lbs.

No. 1519 Steel Window Guards with Ventilation Shields

NO. 1519 Window Guards provide a distinct advantage over other types of window guards in that windows to which they are applied can be opened for ventilation or to cool the barn.

The top and bottom rails of the guards are made of heavy steel angles with vertical upright rods $\frac{3}{8}$ -inch in diameter, spaced $3\frac{1}{2}$ inches apart.

The ventilation shields are built of heavy steel plates welded to angle iron frames.

When the windows are tilted open these shields prevent the air from coming in at the sides and creating dangerous drafts.

These window guards are very simply and easily installed. The shields are first screwed to the window frames. Then the guard itself is put in place. The lower rail being screwed to the window frame and the upper rail being fastened with two bolts to the angle steel frames of the shields.

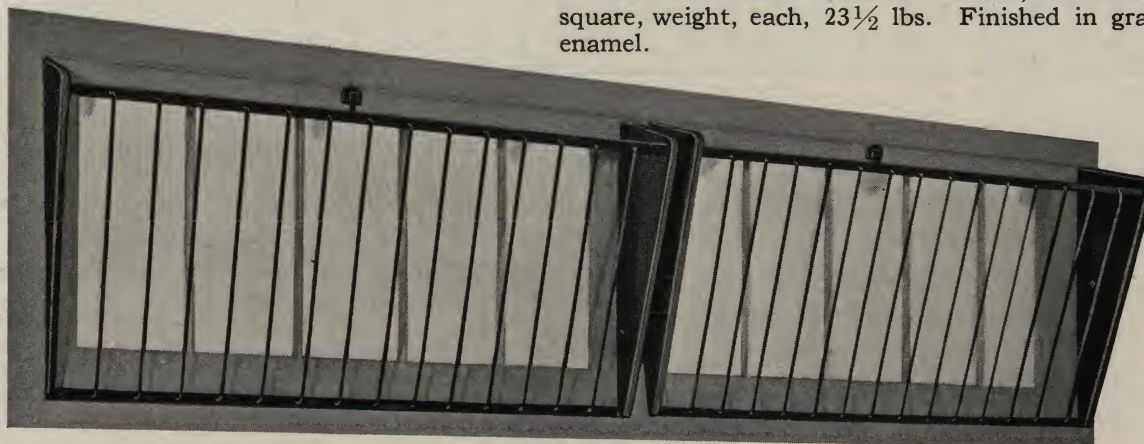
The No. 1519 Window Guard with Shields is 32 inches high and regularly furnished for windows 32 inches wide as shown in the illustration.

However, wider or narrower window guards can be furnished to meet any requirements such as that shown in illustration below.

Window guards can also be furnished in any height. Window guards of unusual height have an extra reinforcement consisting of a one-inch steel angle placed across the center of the upright rods and securely welded to them.



No. 1519 Steel Window Guards, 32 inches square, weight, each, $23\frac{1}{2}$ lbs. Finished in gray enamel.





No. 742 Wrought Steel Stall Guards



Fig. 742

Star Wrought Steel Stall Guard, with Rounded End

THE Star Wrought Steel Guard illustrated above allows free circulation of air, plenty of light and at the same time keeps the animals apart. With this construction, the hames or other parts of the harness are not apt to catch.

The uprights of one-half inch round steel are set three and one-half inches apart on centers in a one and one-quarter inch by one-half inch channel steel frame. A plate is placed upon the top rail to cover the channel and prevent accumulations.

No. 742 Star Wrought Steel Guard, height two feet, is furnished in gray enamel in the following lengths: five, six, seven, eight and nine-foot.

Average weight, per foot, six lbs.



Fig. 743

Star Wrought Steel Stall Guard, with Square End

The Star Stall Guard illustrated above is suitable for use in connection with either single or box stalls. These guards are furnished two feet high, in any length desired.

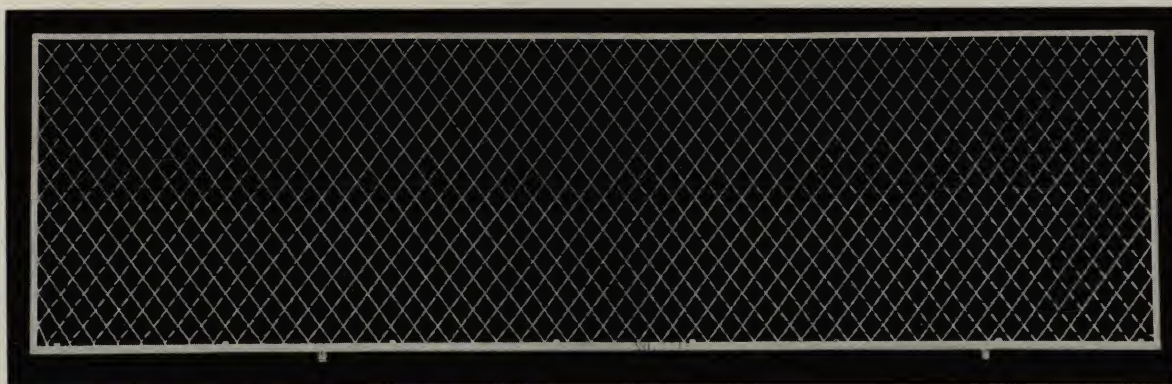
The uprights are of one-half inch round steel and set three and one-half inches apart on centers, in one and one-quarter inch by one-half inch channel steel frames.

Specify exact length desired.

Finished in gray enamel.

No. 743 Wrought Steel Stall Guard, square end, weight per foot seven lbs.

No. 1515 Wire Mesh Stall Guard



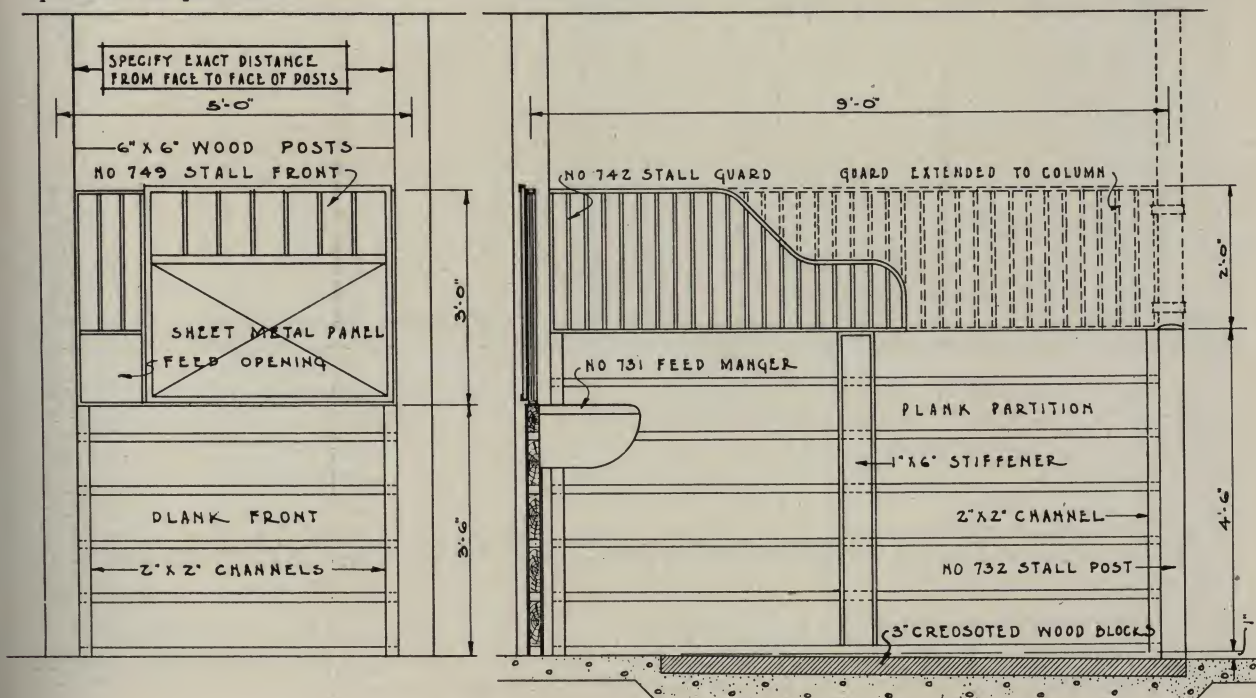
THIS Stall Guard is 2 feet high and is made in any desired length with square ends. Can be made in different heights as desired.
The diamond wire mesh is mounted on heavy steel channel rails at top, bottom and ends. Furnished in black japan.

No. 1515 Wire Mesh Stall Guard, weight per foot, 5 lbs.

Steel Stall Guards Used in Stalls

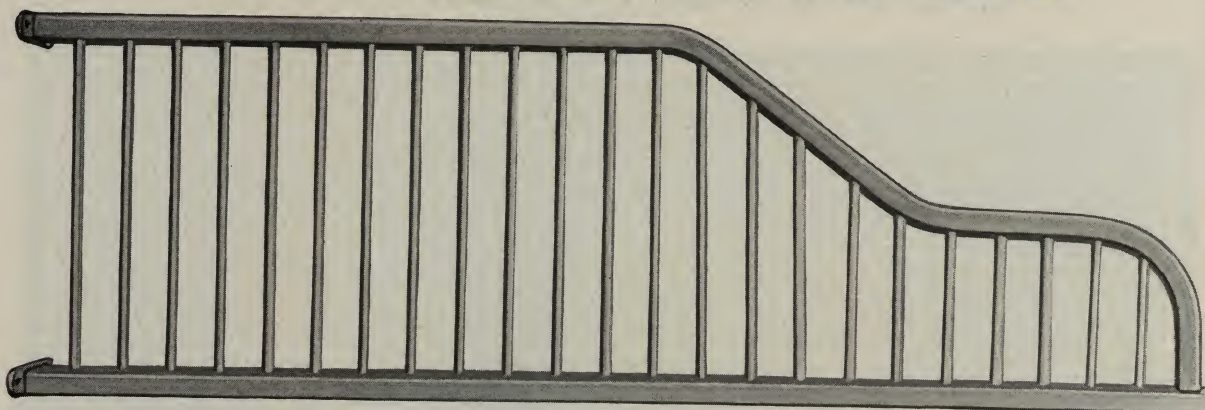
The drawings below show the application of wrought steel stall guards illustrated on the opposite page.

They also show the corner feed manger, combination hay rack and wrought steel stall front illustrated on a preceding page as well as the channels for holding the planks that form the lower part of the partitions.





No. 1502 Pipe Construction Stall Guards



THE Stall Guard shown above is made with top and bottom rails of 1-inch by $1\frac{1}{2}$ -inch rectangular pipe more than the equal in strength of two $\frac{1}{2}$ x $1\frac{1}{2}$ -inch channels put together.

The uprights are $\frac{1}{2}$ -inch rods spaced $3\frac{1}{2}$ inches on center.

Every fourth spindle is a long bolt, with a smooth rounded head, passing down through both top and bottom rails, with a nut on the lower end, below the lower rail.

In the illustration are shown brackets for attaching the front end to wood posts.

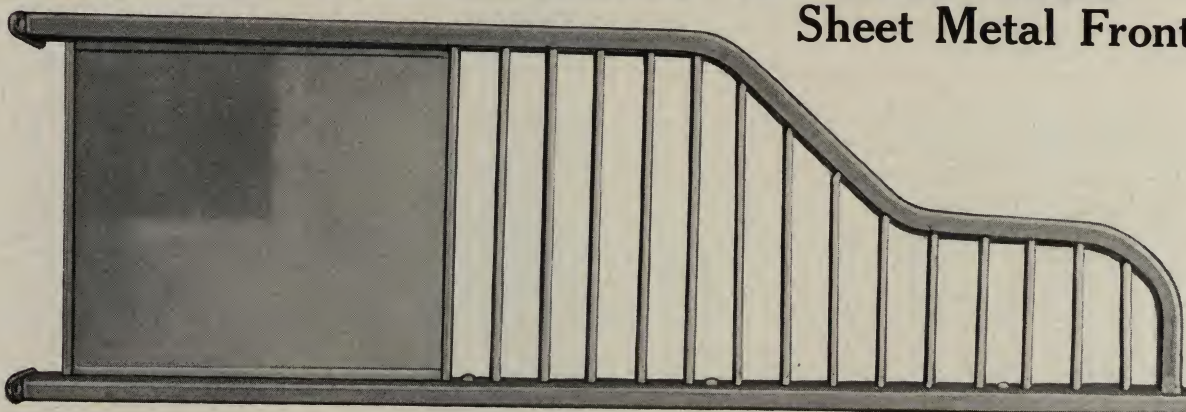
The ends of the stall guards may be fitted with clamps for 4-inch steel columns as shown on the opposite page instead of the wood post brackets shown above.

This stall guard is 2 feet high and made in any desired length from 5 feet up.

Finished in gray enamel.

No. 1502 Pipe Construction Stall Guard, weight per foot, 9 lbs.

No. 1514 Pipe Construction Stall Guard With Sheet Metal Front



The No. 1514 Stall Guard is the same as the No. 1502 shown above with just the difference shown in the illustration—that some of the spindles near the front end are replaced with a heavy sheet steel plate, two feet long.

No. 1514 Pipe Construction Stall Guard with sheet metal front is 24 inches high and furnished in any length from 5 ft. up. Finished in gray enamel.

No. 1514 Pipe Construction Stall Guard with sheet metal front, weight per foot, 9 lbs.

No. 1503 Pipe Construction Stall Guard, Square End

The illustration on the opposite page shows No. 1503 Stall Guard made with top and bottom rails of 1-inch by $1\frac{1}{2}$ -inch rectangular pipe and $\frac{1}{2}$ -inch solid spindles placed $3\frac{1}{2}$ inches on centers.

The illustration shows one end fastened to a wood

wall and the other end fastened to a 4-inch steel column.

This type of stall guard measures 2 feet high and is furnished in any length. Finished in gray enamel.

No. 1503 Pipe Construction Stall Guard, weight per foot, 9 lbs.



Fig. 1503

PIPE RAIL STALL GUARD

Used at top of box stall partition showing horizontal wall brackets at one end and 4-inch column clamps at the other

No. 1504 Pipe Construction Gate for Box Stalls



THIS pipe construction gate for box stalls is constructed entirely within a continuous arch of $1\frac{5}{8}$ -inch O. D. steel pipe suspended on 3 offset hinges which permit the gate to be swung back flat against the stall so it does not project out into the driveway.

There is a double barreled spring latch which operates from the outside but which can be easily reached by an attendant within the stall. The latch can be padlocked.

The top and bottom rails of this gate are 1-inch by $1\frac{1}{2}$ -inch rectangular tubing into which the upright spindles are inserted.

While the $1\frac{1}{16}$ -inch spindles in the upper section of the gate are 5 inches apart there are twice the number of uprights in the lower section, the spacing for the spindles in the lower section being $2\frac{1}{2}$ inches, leaving only $1\frac{7}{16}$ inches in the clear between the spindles.

Long round headed bolts, extending through pipe spindles from top to bottom, hold the gate rigidly together.

Regularly furnished 4 ft. wide, complete with all fittings illustrated, including the hinge post and latch post with the brackets with which they are fastened to the ceiling.

Gates may also be hinged or latched to 4-inch columns.

Finished in gray enamel.

No. 1504 Swinging Gate, weight 180 lbs.

No. 1505 Sliding Gate, weight without track and rollers, 190 lbs.

Sliding Gate for Box Stalls

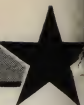


IN many horse barns the sliding type of gate or door is preferred to the kind of gate that swings out. The illustration on this page shows one of this kind which is made of 2-inch plank up to 4½ feet above the floor and 2 feet of diamond mesh stall guard between the top of the planking and the under side of the top rail.

This door slides on Cannon Ball Hangers and Cannon Ball self-cleaning tubular track,

where the working parts of the roller bearing hanger wheels are completely enclosed and protected from dust and dirt.

The diamond mesh guard used at the top of the door can be replaced with any type of stall guard construction shown on the preceding pages to match up with the guards on the partitions surrounding the stall of which the gate is a part.



No. 755 Star Sanitary Feed Mangers

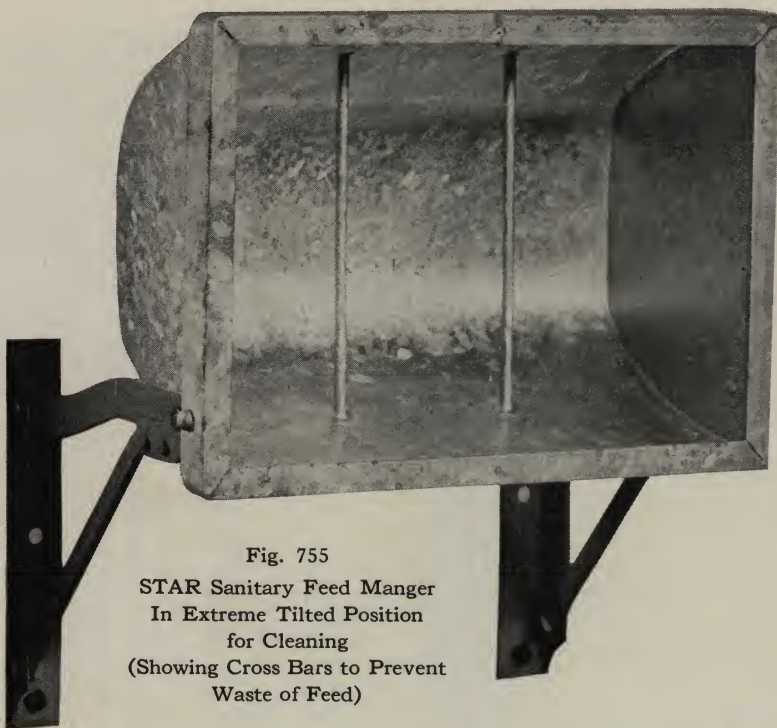


Fig. 755
STAR Sanitary Feed Manger
In Extreme Tilted Position
for Cleaning
(Showing Cross Bars to Prevent
Waste of Feed)

STAR Sanitary Feed Mangers are constructed of 18-gauge, refined, cold rolled steel, heavily reinforced. Being formed without rivets and galvanized after being made up, they are water tight and indestructible.

The shape of the manger itself, all corners being rounded, makes it self-cleaning.

Every manger may be completely turned over before each feeding, permitting absolute riddance of dirt, sour feed, or refuse, before fresh grain is placed in it.

When properly spaced and attached to wall or partition the brackets may be unlocked and the manger set in feeding position shown below.

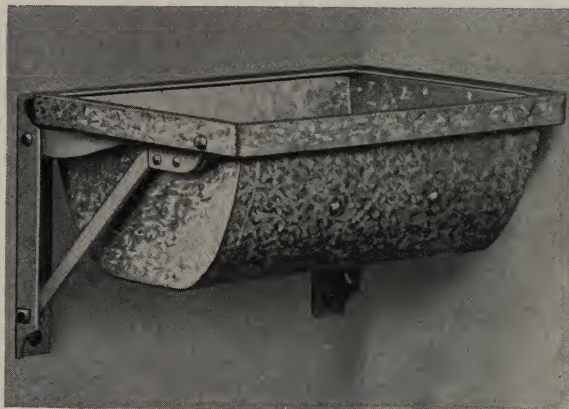
The manger may also be detached from brackets for cleaning and disinfection.

All Sanitary Feed Mangers are equipped with crossbars which prevent the waste of feed and which act as a

check on too rapid eaters. The fact that its use means a saving of from ten to fifteen per cent of the grain fed is a strong argument in favor of its installation.

Furnished, galvanized, in the following sizes:

	Length	Width	Depth	Weight each
No. 1.....	20 in.	12 in.	7 in.	20 lbs.
No. 2.....	20 in.	13 in.	9 in.	22 lbs.
No. 3.....	14 in.	12 in.	7 in.	14 lbs.



STAR Sanitary Feed Manger in Feeding Position



Fig. 757

STAR Sanitary Feed Manger Can be Quickly
Cleaned Before Filling

Star Stable Fittings

Star Stall Posts

STAR Stall Posts are constructed of four-inch, heavy wrought steel tubing to which are attached heavy steel channels—size, two inches by one and three-quarter inches. These channels are attached to the Stall Posts by countersunk machine screws in a substantial manner. The back of each channel is concave to conform to the rounding shape of the stall post. This gives a neat and sanitary construction.

The Figure 732 Star Stall Post is used where it is not necessary to support the loft above. This post is six feet over all, not including ornamental ball. Eighteen inches of this post are intended to extend below the floor line to provide a firm and secure anchorage in the concrete.

The four-foot six-inch channel receives the planks of two-inch dressed lumber which form the stall partition. These planks should be connected by dowel pins or one inch by six inch stiffening boards to keep them in line and to prevent warping.

The Stall Post itself is nicely finished off with a suitable cast iron ornamental ball.

Where the stall posts extend to ceiling we furnish regular four-inch supporting columns, made with either four-foot six-inch or six-foot channels attached as shown in Fig. 733. These channels are the same size and are attached in the same manner as those furnished in connection with our Fig. 732 Star Stall Post.

All Stall Posts finished in gray enamel thoroughly baked on. Fig. 732 Star Stall Post, complete as illustrated, weight each fifty pounds; 54 inch channels two inches by one and three-quarter inches, weight each thirteen pounds; six-foot channels two inches by one and three-quarter inches, weight, each, twenty pounds.

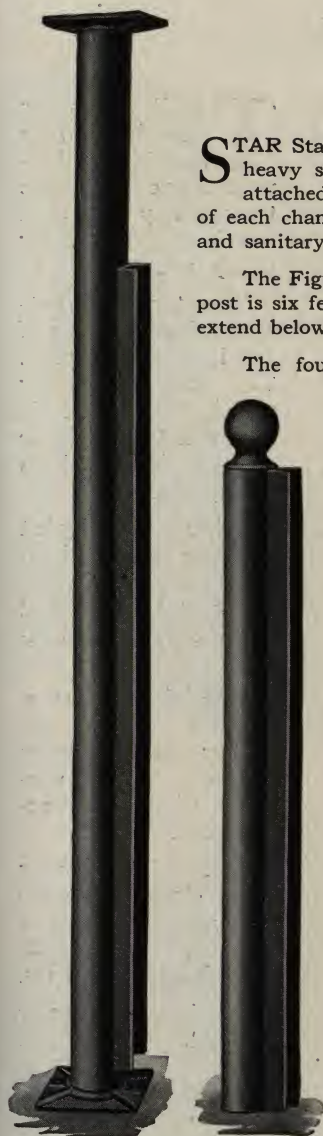


Fig. 733
STAR Stall Posts



Fig. 729
STAR Harness Hook



Fig. 731
STAR Corner Feed Manger

No. 729 Star Extra Heavy Harness Hooks

Star Harness Hooks, as illustrated in Fig. 729, are made of cast iron, extra heavy and serviceable, nicely finished in black japan. Thirteen-inch Star Harness Hooks, weight per doz. eighty-four pounds.

No. 731 Star Corner Feed Manger

The Star Corner Feed Manger, shown in Fig. 731, is made of cast iron—standard size is nine inches deep by seventeen inches by seventeen inches. The front edge is neatly rolled and flanged; furnished in one size only; finish black enamel; weight, each, thirty pounds.



No. 1516 Corner Hay Rack



THIS Corner Hay Rack is a definite improvement over the type of hay rack that has been popular for many years.

The top and bottom rails are made of $1\frac{1}{8}$ -inch O. D. pipe. The side pieces by which the rack is fastened to the walls are 1-inch by 2-inch heavy channel.

The upright spindles are $\frac{1}{2}$ -inch rods spaced $5\frac{1}{2}$ inches apart at the top and $2\frac{3}{4}$ inches at the bottom.

The heavy steel bottom plate of the corner manger slants forward which prevents undesirable accumulations.

No. 1514 Corner Hay Rack measures 30 inches high and extends 24 inches each way from the corner.

Finished in gray enamel. Wt., 25 lbs.

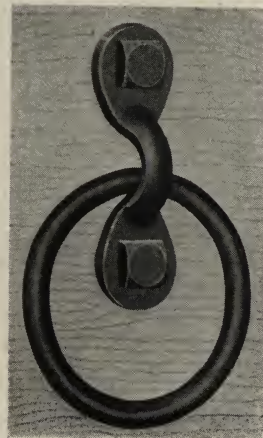
No. 1517 Side Wall Hay Rack is made just like the No. 1516 illustrated above except that it is twice as wide, the top and bottom rails in each case being a half circle instead of a quarter circle. Construction is otherwise identical with the No. 1516 Corner Rack shown above.

No. 1517 Side Wall Half Circle Rack, weight, each, 46 lbs.

No. 1521 Tie Ring

The illustration clearly shows how the Star Tie Ring is made with a heavy wrought ring held in place by a heavy bolted malleable clevis.

No. 1522 Tie Ring for masonry wall is just like the No. 1521 described above and illustrated herewith except that it is furnished with expansion bolts instead of bolts of the ordinary type.



No. 891 Star Horse Water Bowl

THE danger of giving a horse too much water when he is hot is too well understood to require comment. The STAR Water Bowl for horses is, therefore, provided with an attachment that holds up the valve lever until it is released by the operator after the horse has cooled off. When the valve lever is released it drops down and hangs into the bowl at an angle. A slight pressure on this valve lever as the horse drinks opens the valve and admits all the fresh water he wants. The valve snaps shut when horse stops drinking.

This bowl is 11 in. in diameter, 5½ in. deep—deep enough so the horse can drink rapidly without sucking up air. It is equipped with an anti-splash rim. Tapped for 1-inch pipe which brings the water as fast as the horse can drink under any pressure. Pressure governor on each bowl regulates the flow of water and prevents splashing under high pressure. Valve chamber tapped at both ends so bowls can be piped from above or below.

Finished in gray enamel.
Weight, each, 18 lbs.

The valve lever locks up to prevent the horse from drinking before cooling off.

Fresh Drinking Water Constantly Before Them Keeps Horses Fine and Fit.

Fig. 891
STAR Horse Water Bowl, with Slanting Valve Lever, Pressure Regulator, Anti-Splash Rim and Shut-off Device at Bowl.

Starline Ventilators

THE superiority of the Starline Ventilator illustrated on the opposite page is not confined to its neat, symmetrical design, which is about all the illustration can be expected to show.

A number of superior points of construction are enumerated, illustrated and explained on the following pages.

All of these have a very important bearing on the strength of the ventilator and its ability to stand up under the most severe tests of wind and weather.

But the big thing about the ventilator is the work that it does, and here is a ventilator that is scientifically designed for the most efficient operation.

With the development of airplanes more has been learned about the action of air currents than was ever known before and the latest discoveries of aeronautical engineers which could be so applied have been incorporated in the Starline Ventilator.

The efficiency of the Starline Ventilator has been greatly increased by rolling out flat the upper edge of the flare at the top of the flue and the lower edge of the cone. These "leading edges" enable the ventilator to draw more efficiently.

Maximum stiffness has been secured in the storm band and in the edges of the top and bottom flares without increasing the weight by using a double rib of the same design that is used to stiffen the metal wings of airplanes.

By building the base extra strong and building it continuous from top to bottom right up through the base molding and reinforcing the corners, not merely with heavier materials but with double fold seams, rugged strength, stiffness and rigidity have been secured.

Heavy 18-gauge interlocking lateral corner braces—eight of them—prevent the Starline Ventilator from being bent out of shape.

The unique method of crating, which makes the package more compact, saves freight on the Starline Ventilator.

Assembly in four parts saves time and expense by making it easier to handle and erect without danger of its being bumped and damaged as it is being taken up onto the roof.

The general advantages offered by the Starline Ventilator are:

1. Increased efficiency through improved design.
2. Sturdier construction through the use of heavier material and heavier seams has eliminated the use of a wood base, so there is no danger of a wood base rotting out and letting go under a wind strain.
3. Unique crating and close packing have cut down transportation costs.
4. Four-part assembly has cut down erection expense.
5. Copper alloy sheet metal, copper alloy rivets and rust proof bolts all covered with a protecting layer of weather tested aluminum paint guarantee a long life and the maintenance of that distinctive new and fresh appearance.

The Starline Ventilator with flare base, as illustrated, with weather vane and ornaments, is furnished in three sizes.

Number	Flue	Weight
236	36-in.	270 lbs.
230	30-in.	230 lbs.
224	24-in.	150 lbs.

Lightning Rod Attachments at slight extra charge.



Patent Pending
No. 230 STARLINE VENTILATOR
97

Starline Ventilators

THE superiority in construction of the Starline Ventilator begins at the base and goes clear to the tip of the glistening spire. These features are readily apparent in the cut-away view on opposite page.

1. The base is continuous from bottom to top. The 24-gauge body sheets as well as the heavy 18-gauge corners run right up through the molding—clear to the top of the base—and do not end at the bottom of the molding.

This "one-piece" continuous construction of the base eliminates entirely the need of a wooden base frame. The space otherwise required for a wooden base frame is saved. This makes it possible to use larger ventilation flues in a base of the same diameter. It reduces the shipping weight and transportation expense. It also provides an all-metal ventilator—no wood in it.

2. There are four anchors which secure the base to the top of the building—one in each corner. This makes it unnecessary to bridge across from corner to corner for an anchor support. Each of the four anchors is in a heavily reinforced corner where the principal strength is.

3. The top of each anchor strap is riveted directly to the heavy 18-gauge interlocking corner brace at the top of the base. This brace is bolted to a corresponding brace in the bottom of the stack, thus providing a continuous *bolted and riveted 4-way straight line connection from the rafters of the barn to the spire on the ventilator.*

4. The corners of the base are made of heavy 20-gauge copper alloy steel and extend up through the base molding.

5. The body sheets of the base and the balance of the ventilator are made of 24-gauge copper alloy steel.

6. The eight interlocking corner braces are made of 18-gauge steel.

7. Body sheets are joined to the heavy corners by a rivetless button-lock seam that holds tight the full length of the seam. This is an item of great importance in maintaining the rugged solidity and strength of the ventilator base through the years of wind and weather.

8. The seams in the stack or body are of the same button-lock type designed to stand the continuous strain of wind and weather.

9. The heavy double aircraft ribs that run around the throat of the body or stack are of the same design formula that is used to stiffen the metal wings of airplanes.

10. The edges of the top flare and the stack have heavy double aircraft ribs to give them additional strength and rigidity.

11. The storm band is made rigid and firm by having two heavy double aircraft ribs rolled into it.

12. The edge of the top flare on the stack and the edge of the roof or cone are both spun out horizontally. This prevents making any break in the galvanized coating of the material such as might be done by crimping or by a sharp bend. It provides what is known in aeronautical engineering as a "leading edge." It does not obstruct the opening between the flare and the cone but allows this opening to operate at full efficiency.

The No. 230 ventilator stands 9 ft. 5 in. high. The diameter of the stack or flue is 30 inches. The base molding is 49 1/4 inches square and the base measures 51 inches. Weight crated, 230 lbs.

The No. 224 ventilator is of the same design and construction as No. 230 except that the flue or throat has a diameter of 24 inches. The height of the No. 224 ventilator is 8 feet 2 inches. The base measures 40 inches square and the weight is 150 lbs., crated for shipment.

The No. 236 ventilator has a 36-inch flue, base measures 57 inches square, it stands 10 feet 9 inches high and weighs, crated, 270 lbs.

13. The storm band is supported by four heavy 18-gauge triangular brackets. Each bracket is riveted to the storm band. The vertical edge of both members of the bracket is rolled into a tube. Eight galvanized bolts pass down through these tubes and tie the brackets in between the cone and the flare, making them a rigid unit.

14. These tubes built into the bracket are rigidly held between the flat edge of the cone and the flat edge of the flare. They not merely provide a firm, 16-point anchorage for the storm band but they form spacers which hold the edges of the cone and flare at the proper distance apart.

They accurately maintain this space between the cone and flare at the most efficient width and prevent any possibility of the width of that opening being changed, either purposely or by accident.

15. The shape of the top cone between the eight points of support provided by the storm band bracket is accurately maintained by double aircraft ribs.

The mast which holds the ornaments and weather vane is seated upon the heavy 16-gauge top plate riveted inside the peak of the cone.

17. The mast of 3/4-in. tube is held perpendicular by the small bracing cone. This sets down on the roof. It's drawn down tight by the fixed washer on the mast and a nut on the lower end of the mast beneath the top plate. After this nut is on the end of the mast and drawn up tight the peak of the large cone telescopes within the base of the small top cone. This self-centers the mast and holds it rigidly erect.

18. The glistening brilliant ruby ball rests upon another fixed washer on the mast.

19. Weather vane balances perfectly so that it stays level at the center; bearing friction is reduced to the minimum so that it moves in the slightest breeze.

20. The red star within the circle on the weather vane stands out boldly when viewed from either side.

21. The gilded cow, horse, hog or rooster lends still further distinction to the ventilator and to the building which it adorns.

22. The spire, itself, is made of a pure copper tube drawn out to a point. This is heavily nicked and buffed to a high polish that retains a beautiful luster and glistens brightly even in a faint light.

23. The entire body of this Starline Ventilator is made of 24-gauge copper alloy steel.

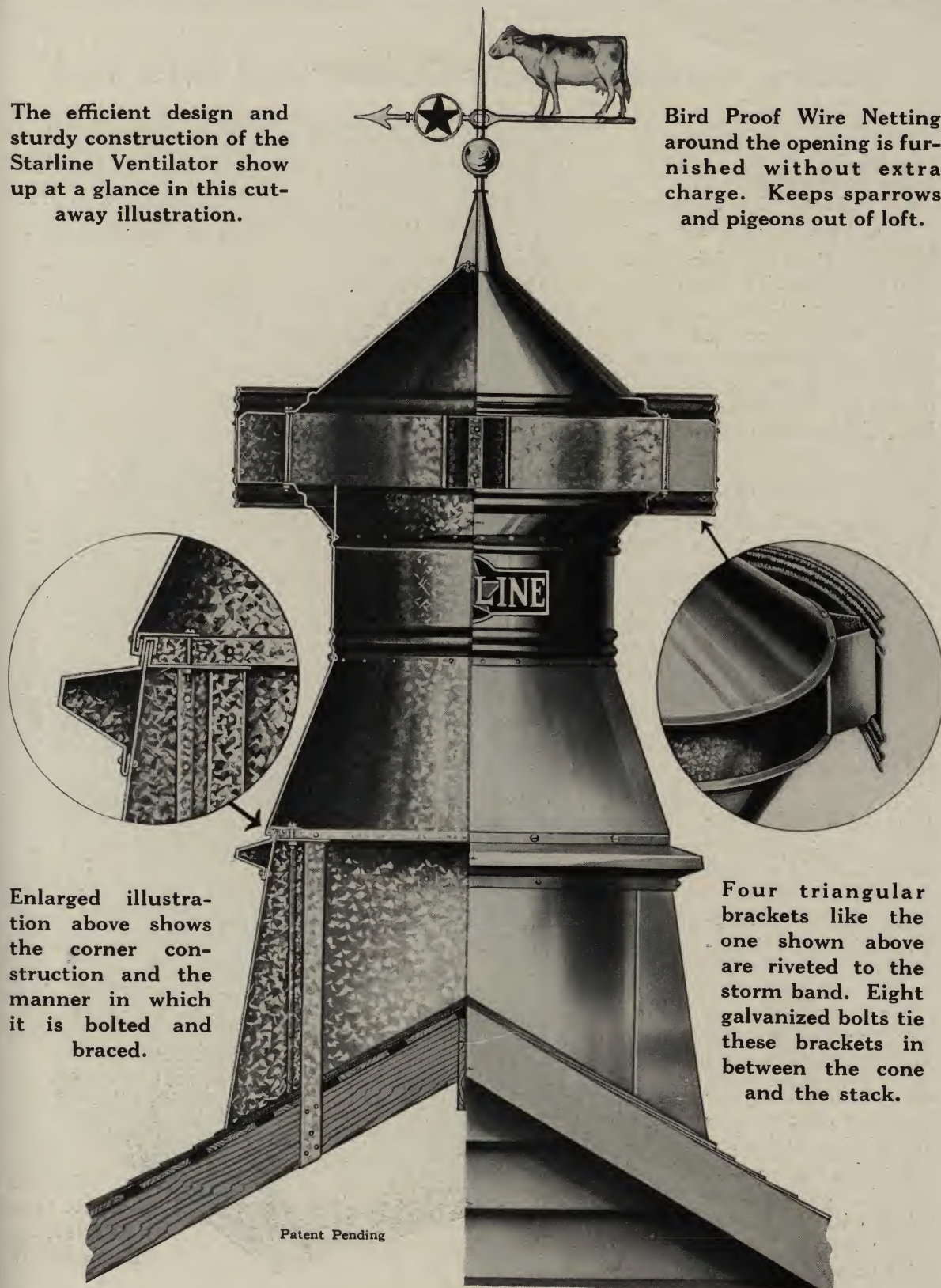
24. All rivets used in the Starline Ventilator are copper alloy. This avoids corrosion by electrolysis which would occur if rivets of any other alloy were used.

25. The bottom flare or skirt of the stack, round at the top and square at the bottom, sets outside the top edge of the base molding, making a weather proof joint.

26. Last but not least, the all metal construction with its rust proof rivets and bolts is still further protected by a coat of satin finish aluminum paint, which tests extending back over many years have shown to be the best kind of outside weatherproof finish.

The efficient design and sturdy construction of the Starline Ventilator show up at a glance in this cut-away illustration.

Bird Proof Wire Netting around the opening is furnished without extra charge. Keeps sparrows and pigeons out of loft.



Enlarged illustration above shows the corner construction and the manner in which it is bolted and braced.

Four triangular brackets like the one shown above are riveted to the storm band. Eight galvanized bolts tie these brackets in between the cone and the stack.

Patent Pending



Starline Ventilator Rides Cheaper and Safer and Goes Up Easier

THE unique method of crating the Starline Ventilator has very important advantages. The Starline Ventilator is assembled in four parts; the base, the body, the storm band and the top cone with the weather vane and ornaments assembled on the mast.

All of these assemblies are nested within each other and each one of them is fastened directly to the crate in four places.

While this more compact crating was designed primarily to cut down the cost of transportation, it was found that it made a package which traveled much more safely because no part rests on another and there is not the likelihood of any part being marred or dented by being rubbed or bumped by another part.

Starline Ventilator is Easy to Erect

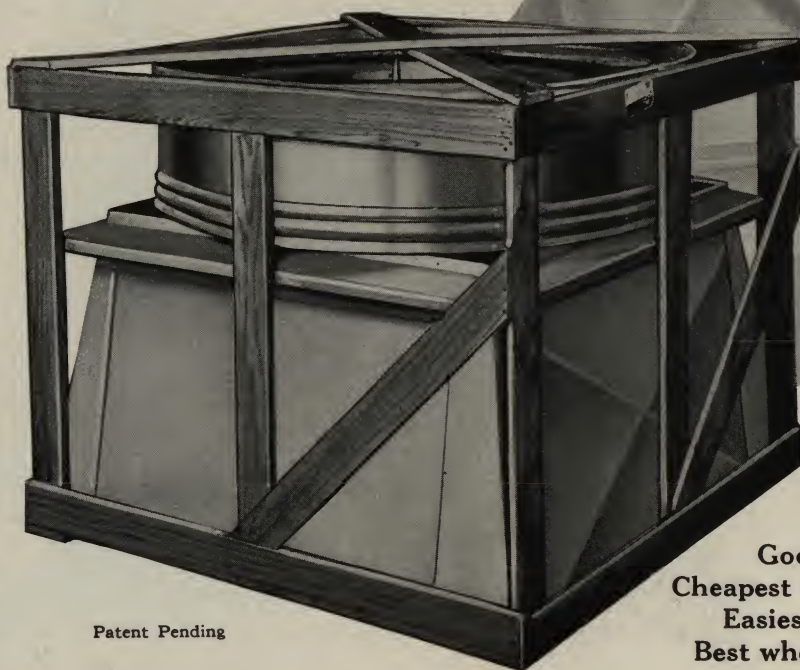
Although it's somewhat easier for two men to put up a Starline Ventilator it can be done without great difficulty by one man working alone.

The base goes up first. It can easily be skidded up a ladder by a man on the roof with a rope.

When base has been leveled and anchored securely over the opening in the ridge of the roof the stack or body is brought up and securely fastened to the top of the base.

The storm band and the top cone are brought up separately for easy handling, assembled together after they are taken up on the roof and fastened to the top of the stack merely by dropping eight long bolts in to place.

The simple ease with which the Starline Ventilator can be carried up and installed represents not merely a saving of time and effort but makes it possible to get the ventilator up without its being dented or scratched on a windy day.



Patent Pending

Good to buy.
Cheapest to deliver.
Easiest to erect.
Best when it's up.

No. 130 AAA Ventilator



No. 130 AAA Ventilator

Patent Pending

HERE'S a real, full size, full capacity, 30-inch scientifically designed ventilator at a very moderate price.

No ventilator at its price is more efficient in operation than the No. 130 AAA Starline. None is more symmetrical.

It can be used with ventilating flues as well as to ventilate the barn loft.

The flare base improves appearance and allows a pair of flues to come in from below without interfering with the hay carrier. Assembly in four parts saves time and expense in erecting and the unique method of packing saves freight and greatly reduces the liability of damage in transit.

This No. 130 ventilator is made entirely of 26-gauge galvanized steel with rust-proof rivets throughout. Rust-proof aluminum finish.

The diameter of the stack or flue is 30 inches. The base molding is $49\frac{1}{4}$ inches square and the base measures 51 inches. Weight crated, 191 lbs.

No. 30 AAA Ventilator is a taper base ventilator—the square base is omitted. Otherwise it is identical with the No. 130 AAA. Weight, 140 lbs.

No. 430 Ventilator is exactly like that described above, except that it is supplied with ornaments and weather vane like those of No. 224.

Lightning Rod attachments furnished at an additional charge.

Efficient in Operation

Symmetrical in Appearance

Economical in Price



STARLINE INC.



Starline Ventilators



Dimensions (in inches) of STARLINE FLARE BASE VENTILATORS—(Ornaments included.)

*No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Wt.
224	19	16	10	11	9	8½	22	40½	24	40	33	40	57½	95½	160 lbs.
*230	24	20	13	12½	13	9	22	50	30	49½	42½	51½	70½	113½	231 lbs.
236	28	21½	16½	13½	18½	9	22	59	36	57	50	60½	82	129	267 lbs.

*TAPER BASE VENTILATORS—(Ornaments extra.)

**12	9	8½	6	5	5	21	12	20	33½	45 lbs.
**16	11	9	7¼	6½	6½	28	16	23	40¼	60 lbs.
**20	14	9	8½	7	7	33	20	28	45½	80 lbs.
**24	16	10	11	9	8½	40½	24	33	54½	110 lbs.
**30	20	13	12½	13	9	50	30	42½	67½	160 lbs.
**36	21½	16½	13½	18½	9	59	36	50	79	192 lbs.

LONG NECK VENTILATORS—(Ornaments extra.)

**L-12	9	26½	6	5	5	21	12	20	51½	50 lbs.
**L-16	11	27	7¼	6½	6½	28	16	23	58¼	66 lbs.
**L-20	14	27	8½	7	7	33	20	28	63½	87 lbs.

SQUARE BASE VENTILATORS—(No ornaments.)

112	8	6½	6	4	6	12	20	16	30½	35 lbs.
L-112	8	6½	29	4	6	12	20	16	53½	40 lbs.
116	9	6½	5½	5	6½	16	24	21	32½	50 lbs.
L-116	9	6½	28½	5	6½	16	24	21	55½	55 lbs.

AAA VENTILATORS

130	24	20	13	12½	15	.....	12	50	30	49½	42½	51½	62½	102½	191 lbs.
(Ornaments included.)															
30	.....	20	13	12½	15	.....	.....	50	30	.....	42½	.....	62½	62½	140 lbs.
(No ornaments.)															

NOT SHOWN

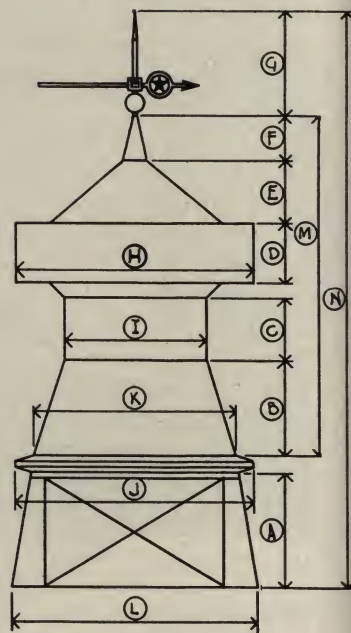
430	24	20	13	12½	15	.....	12	50	30	49½	42½	51½	62½	102½	191 lbs.
(Ornaments included.)															
430T	....	20	13	12½	13	9	....	50	30	.....	42½	.....	67½	.....	160 lbs.
(Ornaments can be included.)															

*Lightning rod can be attached at any time, before or after installation.

*Can be equipped with ornaments and lightning rod at any time before or after installation.

Complete Ventilating Systems with syphon ventilators or electric fans.

Details and prices on request without any charge or obligation.



Why Starline Barn Ventilation Pays a Profit

EVERY dairyman understands very well the importance of keeping cows in a comfortable temperature during the winter time and Government Bulletin No. 187 states that on a light ration for maintenance only, cows are uncomfortable at lower than 50 degrees and that even when being fed heavily

for milk production they should be kept in the barn every night when the temperature falls below 50 degrees and that no cow can do her best in a temperature below 40 degrees.

Where a barn is built warm enough for the best results, ventilation is needed to carry out air impurities and excessive moisture.

Keeps Heat In; Takes Moisture Out

Starline ventilating equipment is designed to eliminate excessive moisture without losing or wasting heat the cows need.

Sweaty, or frosty walls, dripping ceilings, nasty, soggy straw and floors may not them-

selves be harmful but they are evidence of actual harm that is done by excessive moisture in rotting and rusting building material and equipment and of diseases and sometimes even deaths from feeding moldy feed.

Elimination of Excess Moisture Saves the Building, Feed and Animals

A cow of average size gives off approximately 12 to 18 pounds of water every day. That would mean that the water given off by a cow in one day would cover her stall floor with water $\frac{3}{16}$ in. deep.

What becomes of all this water when cold weather makes it necessary to close the doors and windows?

If some means isn't provided to constantly draw it out of the building it results in an excessively moist condition which not only promotes rust, rot and the molding of feed but is uncomfortable to the animals and cuts down milk production in a way that materially reduces profits.

Observations and experiments have shown that too much moisture makes a cow just as

uncomfortable and nervous as too much cold.

Warmth saves expensive feed. Nature has wisely provided that a cow or any other animal gives off much more body heat when the barn is cold than they do when the barn is comfortably warm.

In generating that additional heat, much of the cow's feed is used for bodily warmth and energy that would otherwise be converted into milk.

So, at the same time that Starline Ventilating Equipment is removing foul air and excess moisture it also performs in ways explained on the pages that follow, a double service—by retaining heat, the lack of which would have to be paid for with expensive feed or by a drop in milk production.

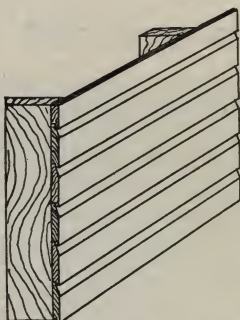
Warmth Is Necessary for Ventilation

Not only is warmth the thing that makes ventilation necessary but it is one of the things that makes ventilation possible.

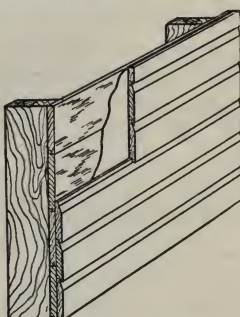
Although the wind blowing across the top of the ventilator on the roof will draw out some of the air that is to be removed through the long flues that extend from the ventilator down into the stable, there are times when most of the ventilation occurs for an entirely different reason. The air inside is warmer than the air outdoors. Warm air is light. It tends to rise in colder air—just like a cork floats to the

surface of water or like hot air and smoke rush up a chimney when a fire is built in the stove or furnace. The warm air within the stable thus rises in the ventilating flues and pours out through the ventilator at the top of the roof carrying excess moisture and other impurities with it.

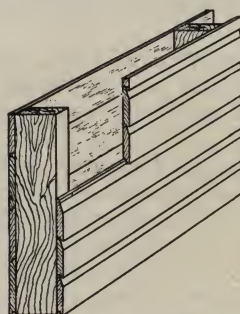
Warmth is necessary to maintain this difference in temperature. That's why Starline ventilation fixtures pay a double profit—because they conserve the warmth generated by the cows while expelling excess moisture.



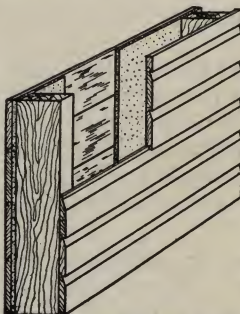
Single Boards Lose .562 B. T. U. per hour through each square foot of wall surface for each degree difference in temperature.



Double boards with building paper between them lose .391 B. T. U. per hour through each square foot for each degree difference in temperature.



Single boards on both sides of studding lose .247 B. T. U. per hour through each square foot for each degree difference in temperature.



Boards on one side with boards and Startex on the other side of studding lose only .187 B. T. U. per hour per square foot for each degree difference in temperature.

Why a Warm Barn Is Necessary

THE barn must be built warm to get the best results from ventilation. The reason for this, as explained on the preceding page, is that the air within the barn will rise through the outtake flues if it is enough warmer than the air outside—even when there is little or no wind blowing across the ventilator on the roof.

The process of ventilation, which is nothing more or less than taking out foul damp air and bringing in fresh dry air, uses up quite a lot of heat. So, the more heat you save by having your barn warmly built, the longer at a time you can run your ventilation system and the better results will be in keeping the barn free of dampness and dead air.

The heat that is generated in a barn is limited to a certain definite amount. It consists of absolutely nothing else but the body heat that is supplied by the cows in the stable.

That is why any ventilation is more successful in a well filled stable. Where the stable is not filled the process of ventilation runs the heat off too rapidly in proportion to the rate at which it is supplied by the bodies of the animals.

Profits Escape with Heat That Is Lost

As much of the animal heat as possible must be retained in a barn for the comfort of the animals. Cows cannot do their best in the way of milk production when the temperature gets below 40 degrees. Below 40 degrees much of the feed that otherwise would go into milk, has to be used up to supply body heat and energy.

So, loss of heat means loss of profits through both lower milk production and greater consumption of valuable feed.

The wall of a building that is perfectly strong from a structural standpoint may be losing a lot of heat.

The amount of heat that is lost through walls can be definitely calculated. If the heat goes out through the walls as fast as the animals in the stables can generate it, the barn will be too cold to be ventilated.

Important as it is to have fresh, dry air in the stable and the excess moisture removed, it is both costly and foolish to do this at the expense of keeping the barn comfortably warm because it's usually a very simple matter to make any barn warm enough to hold the heat that is generated by the animals in the stable.

Then, most of the time, there will be more heat than is absolutely necessary.

This heat can be used for ventilation and where Starline Ventilation is used, you get the maximum amount of ventilation for the heat that is available for ventilation purposes.

Startex Insulating Board Keeps Heat in the Barn

It's a simple matter to plan a new wall construction in a way that will retain the heat.

It is equally simple to insulate the walls of an old building with Startex.

Where the walls of a dairy barn are properly insulated with Startex and the barn is kept well filled with animals and the doors and windows are reasonably tight, a constant surplus of heat is maintained. This surplus heat over and above the actual requirements of the animals' comfort is the heat which is available for ventilation.

The illustrations on this and the opposite page show examples of heat losses that are reduced by the use of Startex insulation on several common types of walls.

A similar reduction of heat loss through any kind of wall is noted where Startex Insulating Board is used.

Startex Prevents Wet Walls and Ceilings

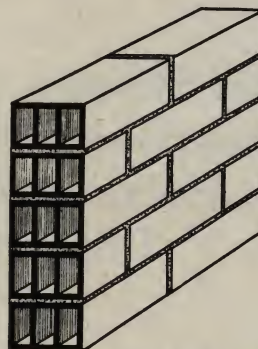
Besides providing the surplus warmth that is necessary in connection with ventilation, Startex performs another very important function; it insulates the inner surface of the wall maintaining a temperature that is nearly like that inside the barn.

This prevents what is ordinarily known as sweating—the accumulation of moisture which would otherwise take place if the walls were cold.

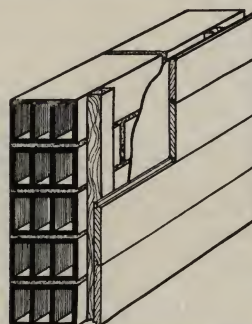
Not all walls need Startex. Some are warm enough without it, depending on the climate in which the barn is located and the number of cubic feet per animal in the barn.

Startex is a firm, tough, fibrous, slow burning board half an inch thick. It can be sawed and nailed like ordinary lumber. It comes in sheets, sizes 4 ft. x 8 ft., 9 ft. and 10 ft.

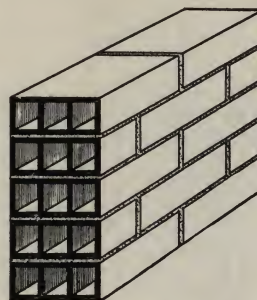
Send a description of your building and wall, floor plan, ceiling height, number and size of cows and definite recommendations will be made without charge or obligation.



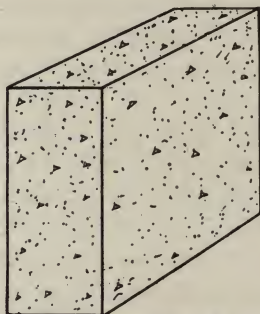
Eight Inch Tile loses .329 B. T. U. per hour through each square foot for each degree difference in temperature.



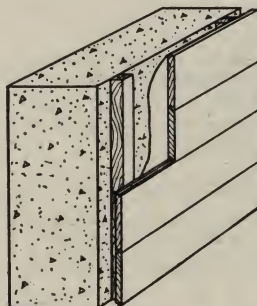
Eight Inch Tile with Startex loses only .188 B. T. U. per hour through each square foot for each degree difference in temperature.



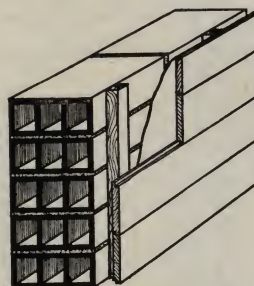
Twelve Inch Tile loses .248 B. T. U. per hour per square foot for each degree difference in temperature.



Twelve Inch Concrete loses .345 B. T. U. per hour through each square foot for each degree difference in temperature.



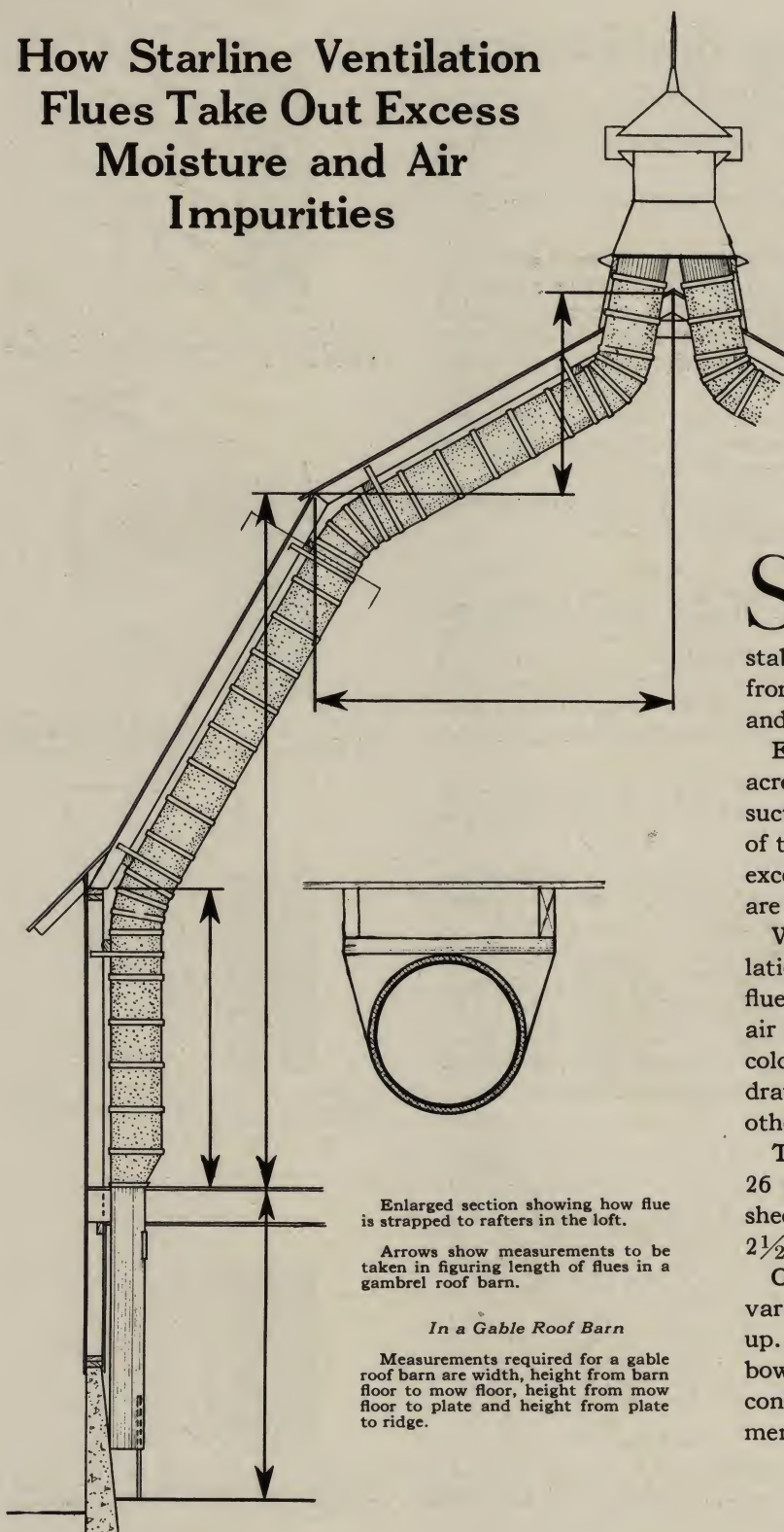
Twelve Inch Concrete insulated with Startex loses only .193 B. T. U. per hour through each square foot for each degree difference in temperature.



Twelve Inch Tile insulated with Startex loses only .156 B. T. U. per hour through each square foot for each degree difference in temperature.

How Starline Ventilation Flues Take Out Excess Moisture and Air Impurities

STARLINE
Ventilation Flues
Protect
The Barn
The Stock
and Profits



Enlarged section showing how flue is strapped to rafters in the loft.

Arrows show measurements to be taken in figuring length of flues in a gambrel roof barn.

In a Gable Roof Barn

Measurements required for a gable roof barn are width, height from barn floor to mow floor, height from mow floor to plate and height from plate to ridge.

STARLINE Outtake Flues extend from the ventilator at the roof down into the stable usually following the rafters from the ridge down to the plate and the wall from there down.

Even a slight wind blowing across the ventilator provides a suction that draws the air up out of the stable and with this air, the excess moisture and air impurities are removed.

When the wind dies down ventilation through these long outtake flues continues because the warm air in the stable is lighter than the cold air outside and tends to rise, drawing the excess moisture and other stable impurities out with it.

These flues are made from heavy 26 gauge copper alloy galvanized sheets and are furnished in lengths $2\frac{1}{2}$ ft. long.

Outtake flues are furnished in various diameters from 12 inches up. Adjustable, interlocking elbows make it possible for them to conform to any practical arrangement, construction or shape of roof.

**STARLINE
Ventilation Flues
Combine
the Siphon and
the Gravity
Principles**

Starline Ventilation Flues Draw Like a Tall Chimney

IT'S well known that the taller a chimney is the better the draft.

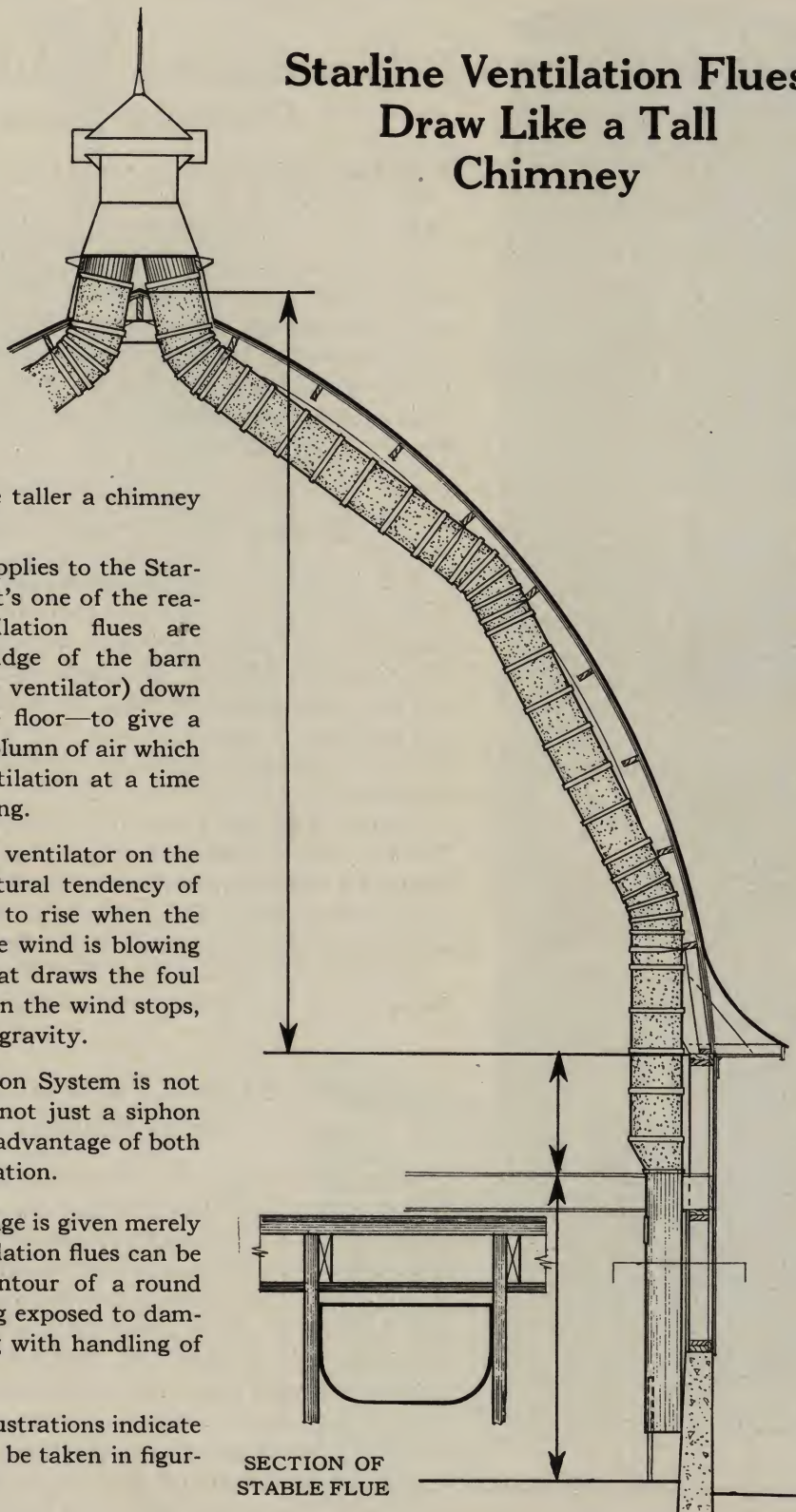
The same principle applies to the Starline ventilation flues. That's one of the reasons why Starline Ventilation flues are brought clear from the ridge of the barn (where they empty into the ventilator) down to within 18 inches of the floor—to give a longer and more buoyant column of air which tends to provide more ventilation at a time when the wind is not blowing.

The siphon action of the ventilator on the roof is replaced by the natural tendency of the warm moist stable air to rise when the wind dies down. While the wind is blowing there is a siphon action that draws the foul air out of the stable. When the wind stops, there is a natural action of gravity.

So the Starline Ventilation System is not just a gravity system and not just a siphon system; it takes the fullest advantage of both principles of natural ventilation.

The illustration of this page is given merely to show how Starline Ventilation flues can be made to conform to the contour of a round or gothic roof without being exposed to damage and without interfering with handling of hay in the loft.

Dimension lines on the illustrations indicate the simple measurements to be taken in figuring length of flues required.





Patent Pending
Section of Starline Flue with
Cut-Away to show lapped edges
of Starflex Insulation.

How Starflex Insulation Makes Outtake Flues Better

THE efficiency of a ventilation flue depends not alone on the tightness of the joints where the different lengths come together but also on the manner in which it is insulated.

The column of warm, moist air constantly passing up from the stable would, naturally, cause the inside of the flue to sweat if the metal flue was kept at the cold temperature of the hay loft.

To avoid this and the undesirable consequence of having the condensed moisture dripping back down the flue and onto the stable floor, Starline flues are covered with a heavy blanket of Starflex, a perfect insulating material.

Keeps Rising Air Column Warm

This insulation also prevents the cooling of the column of air inside the flue. It maintains its warmth, its lightness and its tendency to rise so that ventilation will continue and not stop when the wind quits blowing across the ventilator on the roof.

There is nothing new about the general idea of insulating ventilation flues or the reason why they should be insulated but the use of Starflex provides many improvements in the insulation of Starline flues.

Instead of the usual board-like, brittle insulation ordinarily used, Starflex, which is used for the insulation of Starline ventilation flues, is a flexible material. It has the same texture as a heavy, warm blanket and feels just like one. It conforms perfectly to the shape of the flue—and hugs tight, even at the elbows.

Furthermore, Starflex is applied lengthwise of the flue instead of being cut up into short pieces so there are fewer joints.

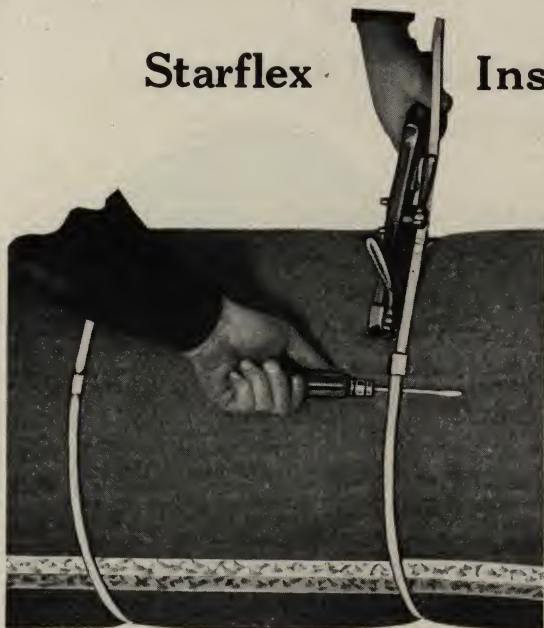
Lapped Seams Prevent Insulation Leaks and Dripping Flues

When the blanket of Starflex is wrapped around Starline ventilation flues, one edge laps several inches over the other edge. By this means the flue is protected all the way around. There is no gap—not even a slight gap, and the elimination of this gap which occurs where the edges of the insulation are butted together, is very important. That gap in the insulation makes a cold strip on the inside of the flue which gathers moisture from the passing column of warm moist air. This moisture runs back down the flue onto the floor.

Starflex insulation avoids the insulation leaks which occur in connection with butted seams. It provides a continuous covering without any insulation leaks, and prevents dripping flues.

Starflex

Insulation Is Easiest to Put On



STARFLEX insulation is easy to put on because it is flexible and so easy to handle.

It feels just like a thick, heavy, warm blanket and that's really what it is—a blanket for the ventilation flue.

Starflex is applied before the flues are put up. A section of flue consisting of several joints is put together on the floor. It is rolled over onto a piece of Starflex cut to the same length as the flue. The edges of the Starflex blanket are picked up. They are pulled around snug

against the outside of the flue, and lapped over at the center. They are held in place by strong galvanized metal bands.

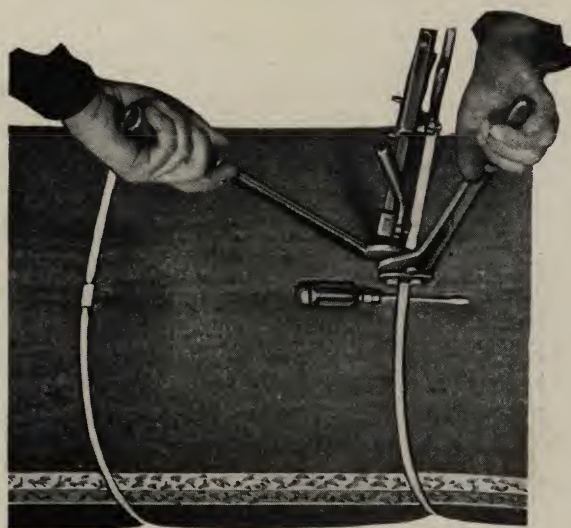
Each band is drawn tight with a special tool as shown in the upper illustration. This tool holds the band while the lock seal is set over the bands where the ends overlap and locked in place with the sealer as shown in the lower illustration.

This method of banding the insulating material to hold it in place is as much of an improvement as the ventilating material itself. Simple tools are furnished with each job to draw the bands up tight and lock them in place.

The illustration above shows the band being drawn tightly around the flue. The lower illustration shows the band clip being locked into place.

The screw driver is used merely to raise the band away from the flue so that the sealing tool can get a good grip on the locking seal that locks the band.

The two special tools are furnished with every ventilation job where they are needed. The slight charge which is made for them merely as a matter of record is cancelled upon their return.



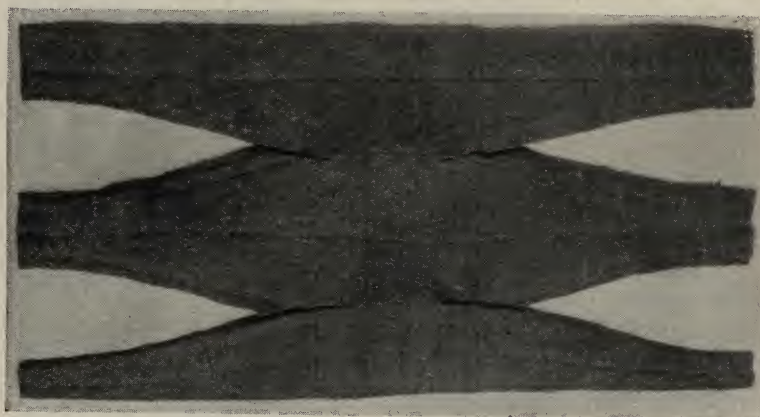
Patent Pending

Starline Lock-Seam Insulated Elbows

Lock into Any Desired Position

THE elbows used with Starline ventilation flues are made with the edges of each section turned out. Adjacent standing edges are held together with a concave band clamp that is drawn up tightly with a bolt after the proper adjustment in the elbow is made.

These elbows are adjustable to any angle or bend. The tightening of the clamps where the sections of the elbows come together locks the elbow in position and prevents it from being bumped or twisted out of shape after it is properly adjusted.



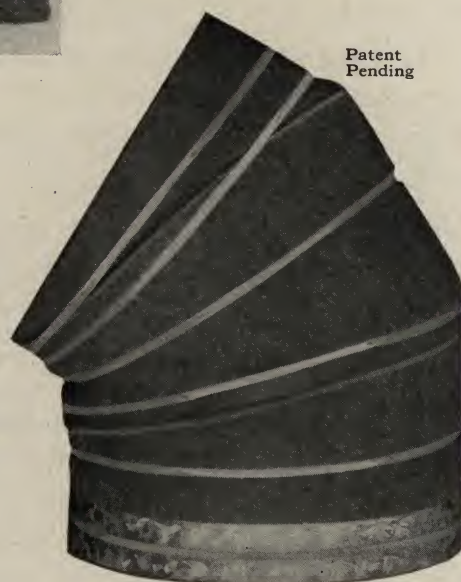
Patent Pending

Starflex Cover Is Easy to Put On

The illustration at the left shows clearly how the warm insulating blanket of Starflex is cut so the entire elbow can be covered with one piece.

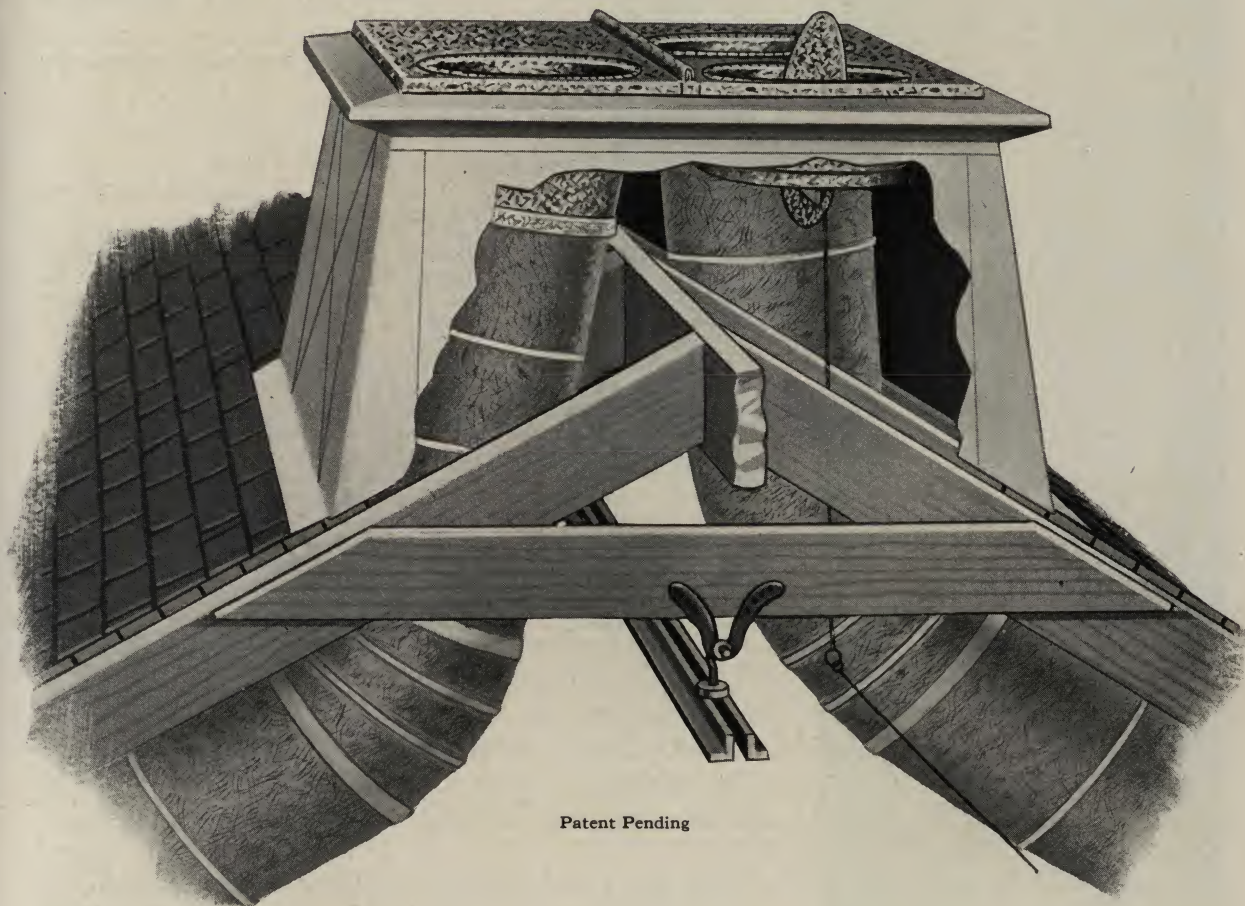
One-Piece Starflex Cover Avoids Leaks

The outside sections of the elbow are covered first and the Starflex wrapping held in place with tight metal bands. Then the center section overlaps the outer pieces and is banded in place. This overlapping of the sections of Starflex avoids butted joints and eliminates any insulation leaks that might cause the gathering of moisture inside the flue and the moisture dripping back onto the stable floor.



Patent Pending

Starline Base Cover Increases Suction of Outtake Flues



Patent Pending

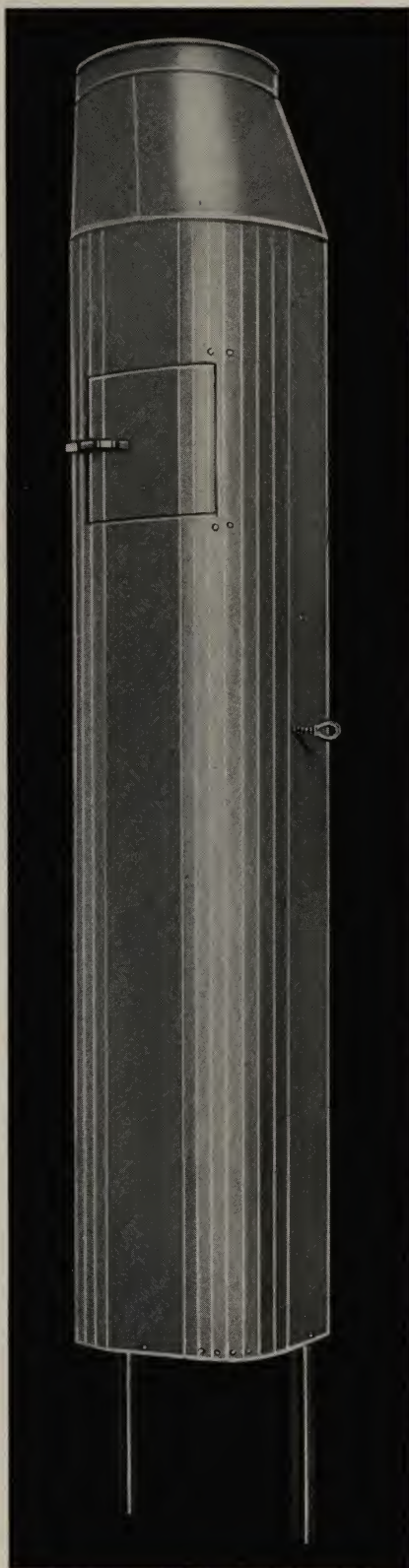
U. S. GOVERNMENT bulletin No. 187 reports a number of observations which prove conclusively that the effectiveness of ventilation flues is increased anywhere from 10 to 30% by the use of a device which closes that portion of the ventilator base which is not actually occupied by the flues.

It stands to reason that this should be so because, unless it is prevented in some way, a part of the ventilator suction is applied to the space around the outside of the flues. In other words a portion of the air that is siphoned out through the ventilator comes from the loft instead of the stable.

The Starline base cover completely closes the top of the ventilator base. Openings are left for the flues, with another opening which is provided with a damper. When this damper is opened it permits a portion of the air to be drawn from the loft which is sometimes desirable.

Starline base cover being made in two parts is easy to apply just before the stack or body of the ventilator is set upon the base.

It is made of heavy copper alloy galvanized material. It can be had to fit 24, 30 or 36-inch Starline ventilators and one is used with each ventilator in every Starline ventilating system.



Starline Stable Flues Save Stable Heat

Permit More Ventilation in Cold Weather

"This test shows that approximately 50% more ventilation may be maintained with floor outlets than with ceiling outlets, with approximately the same stable temperature."

—U. S. Dept. of Agriculture, Bulletin No. 187.

Take Cool Air Off the Floor

Starline Stable Flues take cool air off the floor instead of draining the heat off the ceiling as fast as it is generated.

This point is extremely important because the heat that is thus saved not merely contributes to the comfort of the animals but it saves the cost of feed that would otherwise be converted to the needs of body warmth when the temperature drops. It also helps to maintain the temperature that prevents a drop in milk production.

Saves Both Heat and Profits

The heat thus retained by the use of a Starline Stable Flue which comes down within a few inches of the floor, saves profits along with the heat by thus saving feed and preventing drop in milk production.

Each Starline Stable Flue is provided with a damper and also with a cooling door. When the damper is shut off and the cooling door open ventilation takes place through the cooling door and the air is drawn off the ceiling instead of off the floor.

In the government bulletin mentioned above a test was reported where, by using the floor opening in ventilating flues the temperature in the stable was kept 52 degrees warmer than the temperature outside although the volume of air removed by ventilation in one hour was seven times the volume of the stable.

In this same barn the difference in the temperature between the inside and outside was brought down to 30 degrees although the air changes were reduced two-and-one-half per hour when the ventilation took place through the opening at the ceiling.

The Cooling Door Regulates Stable Temperature

The Cooling Door at the ceiling is, therefore, just what the name implies, a device for cooling the barn. This is a very desirable feature because one object of ventilation is to maintain an even, comfortable temperature—not too hot, not too cold.

Starline Stable Flue Is Flattened Against Wall

As the illustration shows Starline stable flue is flattened on one side instead of being round like the loft flue. The purpose of this is so that it will not project far enough out from the side wall of the stable to be objectionable.

Round Stable Flues Optional

Round Stable Flue can be furnished instead of the D-shaped flue.

The boot shown in the illustration at the top of the Stable Flue is used with the D-shaped flue to make a smooth, tight, perfect connection between the top of a D-shaped Stable Flue and the bottom of the round Loft Flue.

Damper Controls Air Movement

At times, when extreme cold prevails, it is desirable to reduce the amount of ventilation because no stable should be ventilated to the extent that it gets uncomfortably cold. A damper in each stable flue permits it to be shut off. The U. S. Dept. of Agriculture has discovered it is better to shut off some of the outtakes entirely rather than to partially close all of them, and that ventilation can be regulated only through the outtake flues.

Sizes and Construction

Starline Stable Flue is made of heavy, 18-gauge, galvanized copper alloy material and comes in the necessary sizes and height to fit every need and condition.

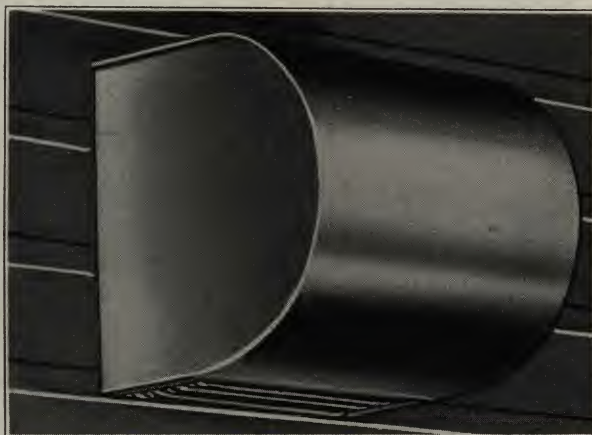
Starline Intakes Distribute Fresh Air Uniformly

Safe, Simple and Trouble-Proof
Absolutely Automatic

WHEN damp foul air is withdrawn from the stable through the outtake which must be replaced with fresh air from the outside, it's dangerous to bring this fresh air in through the windows during cold weather. It creates cold drafts and leaves certain spots of the stable unventilated.

Starline Intakes provide the safest way to bring in fresh air. They admit fresh air in equal amounts in all parts of the stable so that the purpose of removing damp, foul air and bringing in fresh air is accomplished without dangerous drafts.

They are made of 22 gauge copper alloy galvanized steel. Top, front, back and bottom are all one piece—no joints. Weight each, crated, 20½ lbs.



Starline Fresh Air Intake

Patent Pending

Starline Intakes Maintain an Even Flow of Fresh Air Regardless of Direction or Speed of Wind

Each intake in a system brings in about the same amount of air. This automatically provides for even distribution and diffusion of air and avoids dangerous drafts.

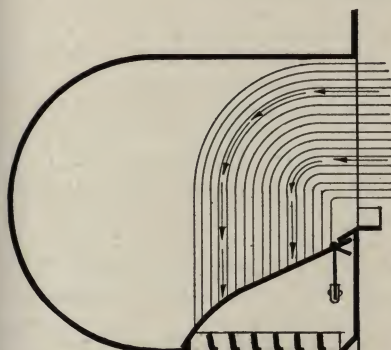
The uniform flow of air is partially due to the shape of the control box. The air inlet being horizontal rather than vertical reduces the influence of the wind. Curved louvres at this entrance direct the flow of air along the front wall of the intake. They operate on the same principle as that employed to increase turbine efficiency.

The statically balanced damper is normally closed but as it weighs only two ounces it rises to a wide open position as air moves in. It remains in this position as long as the outtakes continue to draw or until a gust of wind increases the velocity of the air. Increased velocity of the air pushes the damper up past the wide open position. As it rises further it picks up the auxiliary counter weight. The weight brings it back to the wide open position as soon as the gust of wind subsides.

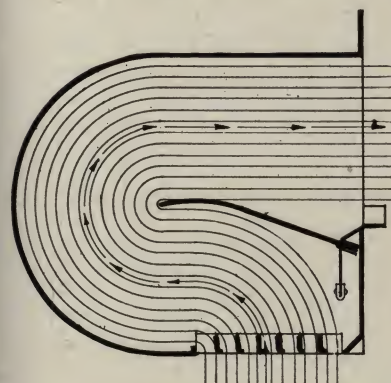
As the damper continues to rise it partially closes, so the volume of air entering the barn remains constant; the balance maintained between the velocity pressure and the auxiliary weight results in a uniform volume of air—the volume being equal to the velocity of the air current multiplied by the area of the opening.

The auxiliary weight hangs on independent bearings. It has no effect when the damper is moving up to the wide open position.

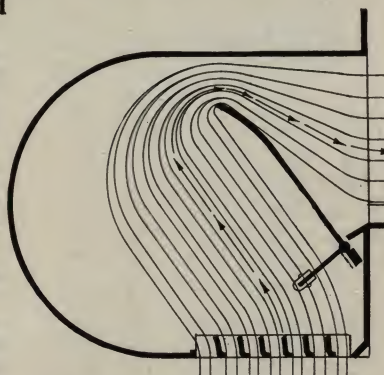
The damper never entirely closes the vertical opening so it is impossible for a gust of wind to either close the intake or increase the amount of air entering the building.



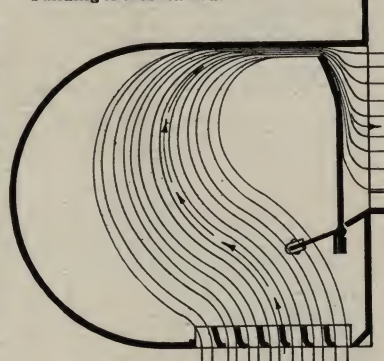
Any tendency to "back draft" is promptly checked as the sensitive damper snaps shut the instant the air starts to back up. Damper stands in this position when no air is being drawn into building.



Counter balanced damper takes position shown above with a mild inward flow of air.



When the speed of the incoming air increases the damper moves up into this position. It partially closes the opening so that an even volume of air entering the building is maintained.



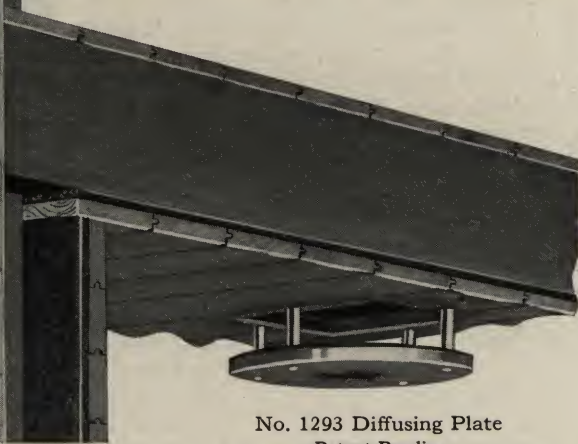
When the air rushes in still faster the size of the opening is still further reduced by the damper moving into an almost vertical position so that under any wind pressure there is an even volume of air entering the stable. Under an extremely strong wind the opening is almost closed.

No. 1282 Starline Automatic Intakes Bring in Air as Needed



No. 1292 Intake Control Box

They always work. They prevent dangerous drafts and back drafts.



No. 1293 Diffusing Plate
Patent Pending

THE above photographic illustration and the diagram below explain clearly the operation of the Starline Intake which brings the outside air in between the joists and through an opening in the ceiling, flows gently in the stable.

An opening $13 \times 7\frac{5}{8}$ in. is all that is necessary.

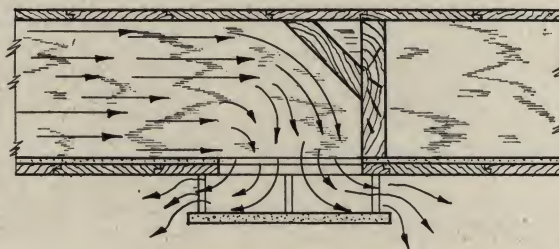
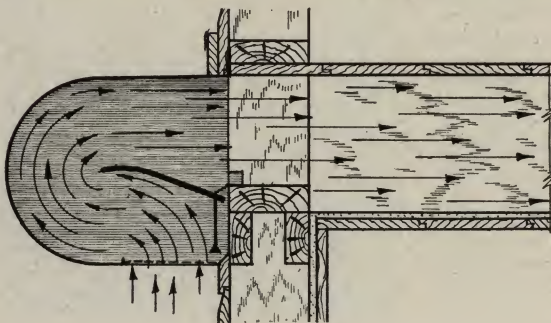
As the air comes out of the ceiling opening it encounters the round diffusing plate which breaks up the incoming column of air and spreads it evenly on all sides providing a diffusion or a mixture of the fresh air with the air that is in the stable in a way that cannot possibly be accomplished by a diffusing plate of any other shape.

Where To Place the Intakes

The simplest of all intakes is made by placing the Automatic Control Box outside the wall as

shown in the illustrations on this page. The air which comes into the building between the joists can be brought clear over to the center, as it will be in most cases. However, one ceiling opening with a round diffusing plate under it should be placed near each corner no matter how many other intakes are used. The purpose of this is to avoid the possibility of damp corners and dead air pockets.

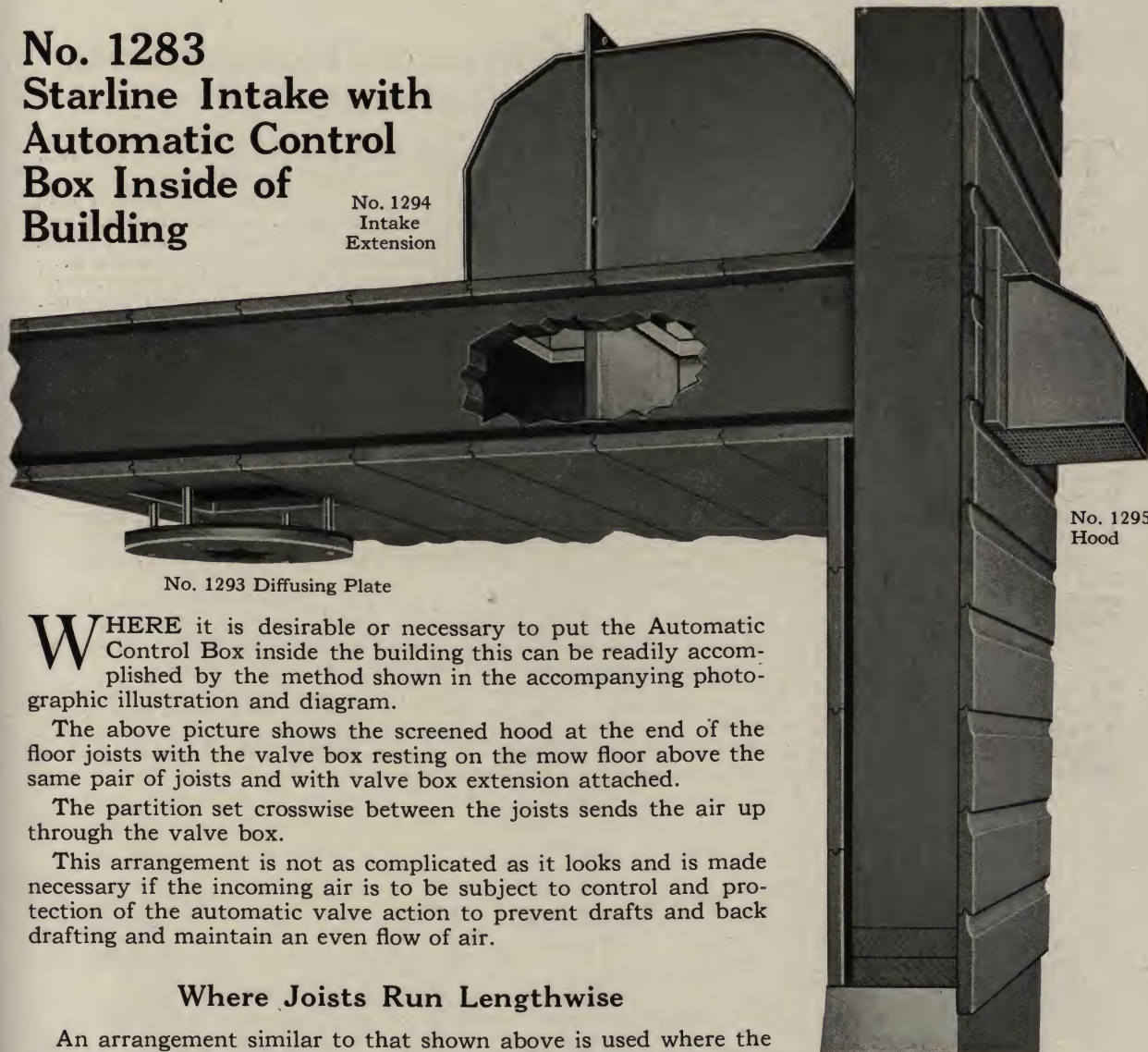
Unless the ceiling is already insulated, as it is shown in the illustration above, a strip of insulating material the full width of the space between the joists should be laid in the bottom of the intake flue. This prevents the boards which form the bottom of the intake flue from being chilled by the cold incoming air to a point where moisture will gather upon them where they come in contact with the warm moist stable air.



No. 1292 Intake Control Box

No. 1283 Starline Intake with Automatic Control Box Inside of Building

No. 1294
Intake
Extension



No. 1293 Diffusing Plate

No. 1295
Hood

WHERE it is desirable or necessary to put the Automatic Control Box inside the building this can be readily accomplished by the method shown in the accompanying photographic illustration and diagram.

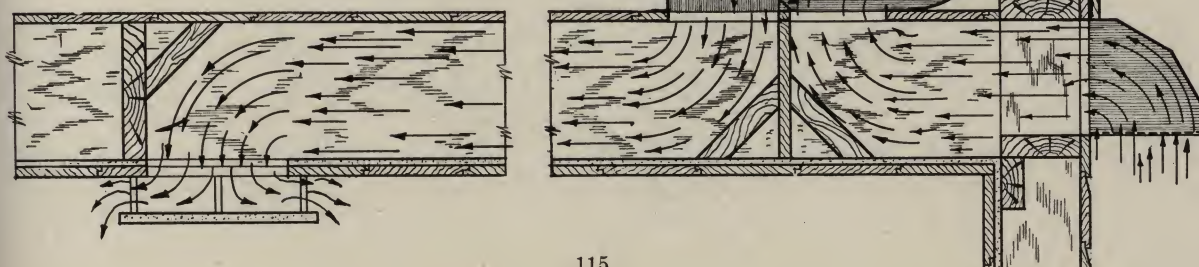
The above picture shows the screened hood at the end of the floor joists with the valve box resting on the mow floor above the same pair of joists and with valve box extension attached.

The partition set crosswise between the joists sends the air up through the valve box.

This arrangement is not as complicated as it looks and is made necessary if the incoming air is to be subject to control and protection of the automatic valve action to prevent drafts and back drafting and maintain an even flow of air.

Where Joists Run Lengthwise

An arrangement similar to that shown above is used where the air must be brought in across the joist. The intake duct is a simple wooden box with an insulating board laid along the mow floor. Blue-printed detail of this type of intake extension duct will be supplied with every ventilation job where such an arrangement is required, or may be had upon request.



Different Climates Bring Different Requirements for Warmth and Ventilation

THE map shown below is taken from reports of the United States Weather Bureau indicating the four zones of different average winter temperature.

In Zone 1 barns must be built much warmer in order to provide, under all temperature conditions, sufficient heat in excess of that needed for animal comfort—so that the air may be changed by ventilation often enough to remove the excess moisture and impurities without cooling the barn to an uncomfortable degree.

In the most northerly zone not only should the barn walls be carefully insulated but doors and windows should fit snugly. Where sliding doors are used they should be equipped with latches that draw them tight against the casing.

Vestibule doors are also recommended for extremely cold climates. Where the outer door opens into a feed room and another door opens from the feed room into the stable, the feed room in a sense becomes a vestibule that prevents the cold air from blowing directly and dangerously upon the animals in the stable.

Storm windows are also recommended for barns in Zone 1 not merely to reduce the condensation of moisture and frost on the windows, but to cut down the heat that is lost by radiation through the window glass.

It is impossible to state exactly just what the requirements are for each zone because it depends entirely upon the number and size of the animals in the stable in proportion to the volume of stable air that the animal heat is required to warm up. It varies in different barns.

Our engineering department will be very glad to make definite recommendations in regard to any barns, new or

old, as to steps which should be taken to head off cold, damp, soggy and costly stable conditions.

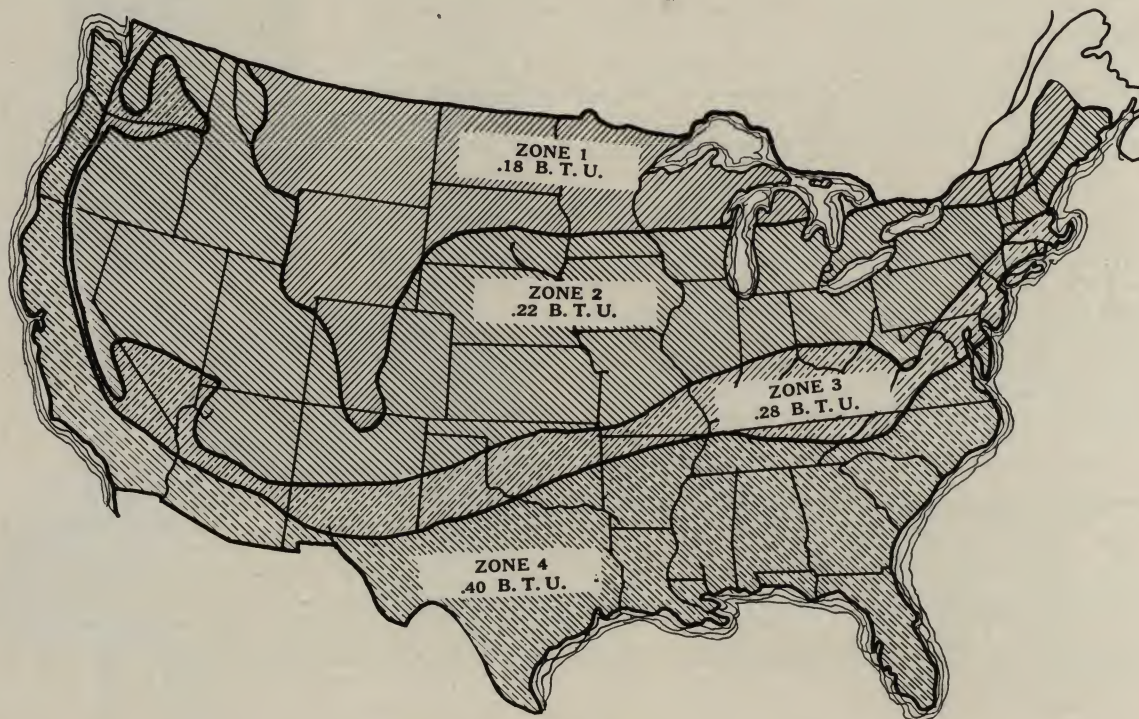
However, as a general practice, it is difficult to build a barn too warm and any investment in warmth and comfort will be promptly justified in profitable results in the production of milk, because the more heat there is available the less often the ventilation system will have to be shut off to prevent the inside of the stable getting below the critical temperature.

Where walls, windows and doors are reasonably tight and the stable is sufficiently filled with stock so that not over six hundred cubic feet of air has to be warmed up by each cow of average size or its equivalent in other stock, Starline ventilation can be used if the heat loss through the walls is no greater than the following:

- Zone 1—.18 B.T.U.'s per square foot, per hour
- Zone 2—.22 B.T.U.'s per square foot, per hour
- Zone 3—.28 B.T.U.'s per square foot, per hour
- Zone 4—.40 B.T.U.'s per square foot, per hour

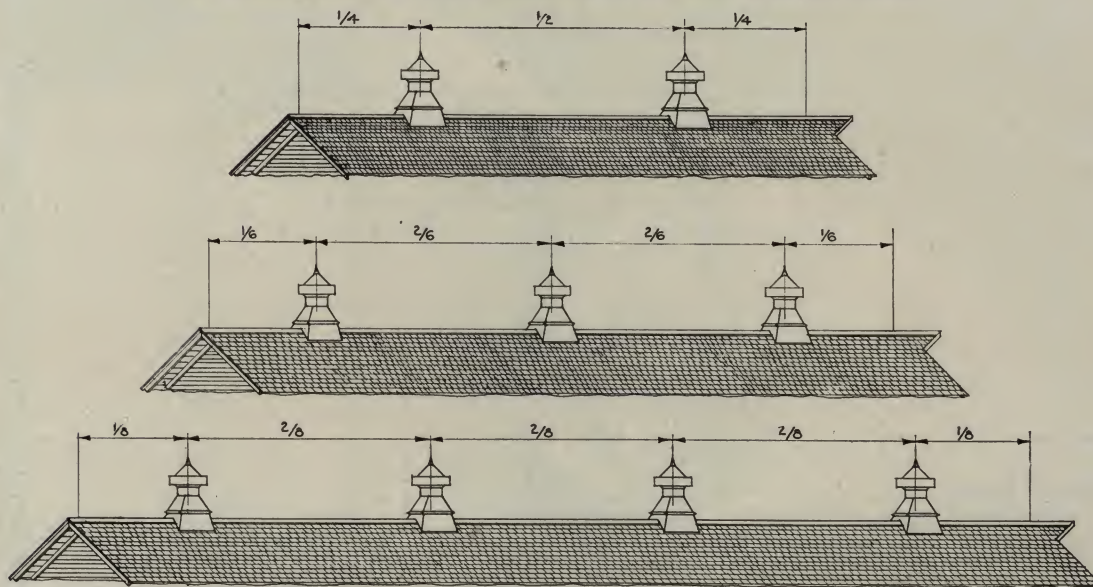
Where the heat loss is greater than indicated in the table above, it can generally be quickly, easily, inexpensively and satisfactorily reduced by the use of Star-tex insulating board on walls and ceilings.

Ceilings in Zones 1, 2 and 3 should be insulated unless the loft floor above the stable is kept completely covered with hay and straw at least a foot deep and headers inserted to prevent cold air from blowing in between loft floor joists.

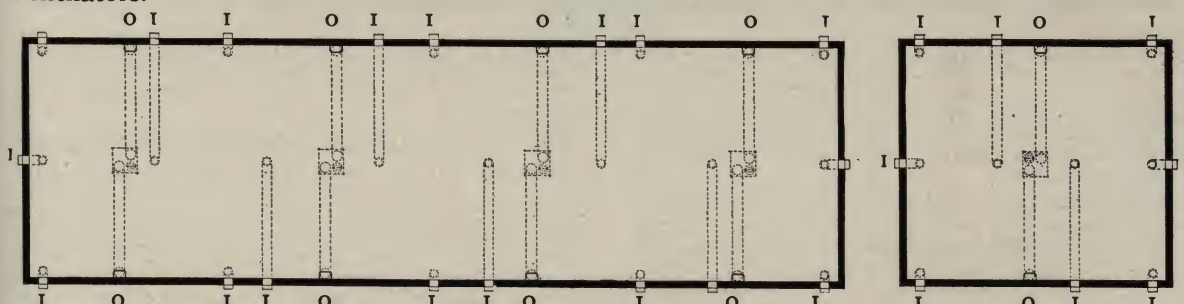


How to Arrange Starline Ventilation

The arrangement of the ventilators on the roof is shown below.

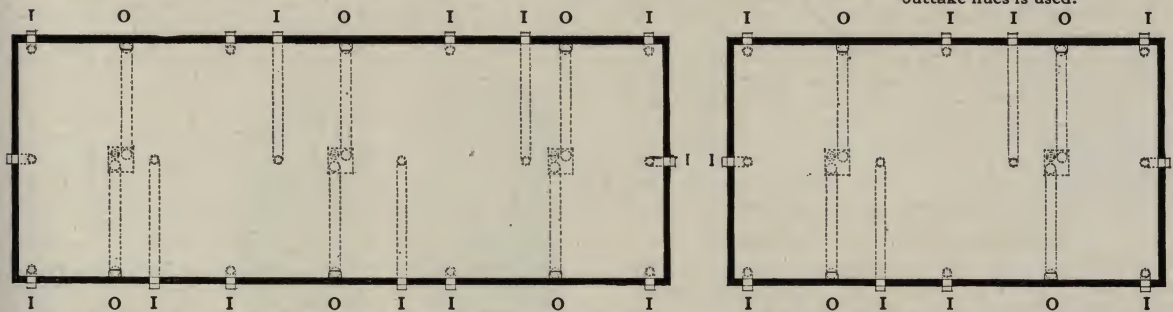


The four plans which follow are typical arrangements of the Starline Intakes, Outtakes and Ventilators.



Arrangement of intakes and outtakes with a system that requires four ventilators, for use in barns of ordinary width (30 to 36 ft.) and 120 ft. long.

In barns up to 40 ft. long, a single ventilator with two outtake flues is used.



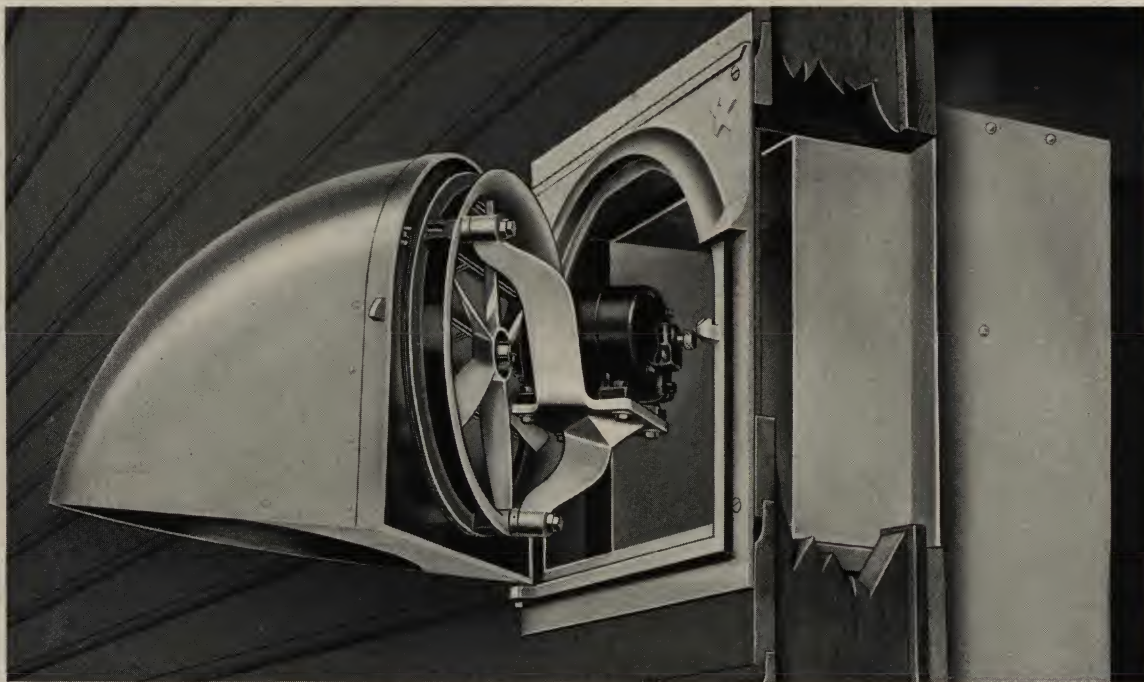
Plan for a barn 30 to 36 ft. wide and 90 ft. long using three ventilators and six outtake flues.

Two ventilators and four outtake flues in a barn 30 to 36 ft. wide and 70 ft. long are shown above.

Let Us Figure It Out for You Without Charge or Obligation

Send a rough sketch showing barn size and shape of the roof, giving height of stable ceiling, describe stable wall and give height of barn and we'll be glad to supply a plan for conditioning the air in your barn and complete figures on cost, without charge or obligation to you.

Starline Electrical Ventilation



Patent Pending

STARLINE Electrical Ventilation works under any and all conditions of wind and temperature. It provides the most accurate, positive and economical way of removing dead air and excess moisture and of maintaining an even temperature that is most comfortable and healthful for the animals and most profitable to the farm operator.

Starline Electrical Ventilation consists of four parts.

- 1st. The fan with automatic shutters which exhausts the air through an opening in the wall.
- 2nd. The stable flue which brings the foul air and excess moisture from the floor to the fan or takes warm air off the ceiling if the damper is so adjusted.
- 3rd. Intakes which let in the same volume of air as that exhausted by the fans when running at full speed.
- 4th. Thermostats which act like safety valves can be set to shut off the fans at any desired minimum temperature—usually 40 degrees in a cow barn.

A master switch controls the fan circuit. Triple Acting Dampers in the stable flues can be set to take cold air off the floor to retain animal heat in the stable or warm air off the ceiling to cool the stable—or part from the floor and part from the ceiling, as desired.

Dangerous Drafts Avoided

The danger of drafts is avoided by using a fan for every seventeen average size cows or other stock of equal weight instead of using one large fan to take all the air out at one place. In this way much better diffusion is also provided. Building large branching outtake flues from a large fan would be more costly than additional fans and somewhat unsightly.

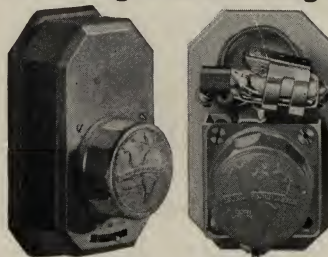
The former practice of mounting Starline Fans in the stable flue has been discontinued. The reason is that when the fan was mounted on it, the flue, particularly

if made of metal, became not only a sounding board but a sound amplifier which might turn the whispered hum of the quietest fan into a deep roar that certainly was not desirable.

Fan and Louvres Mounted Together

The fan is firmly bolted to the back of the heavy iron frame on which the hood and louvres are mounted. This is hinged to the massive iron base fastened to the wall. The frame can be swung out to inspect or oil the fan. Louvres drop shut when the fan stops and prevent wind blowing into the barn. The curvature of the hood is such that it has less effect on the efficiency of the fan than any other shape of hood. The insulating gasket under the ring prevents cooling the fan by outside contact; the fan remains at the inside temperature, preventing frost and condensation on the fan.

No Danger of Cooling Barn Too Much



Thermostat

the temperature gets to the danger point.

Thermostats connected with the fans shut them off automatically at any desired minimum temperature and turn the fans on automatically again when the barn has sufficiently warmed up.

Severe drops in temperature are dangerous and expensive. They lower the vitality of the cow and reduce the flow of milk. This danger and expense is eliminated by the highly sensitive thermostats which automatically shut off the fans when

Starline Electric

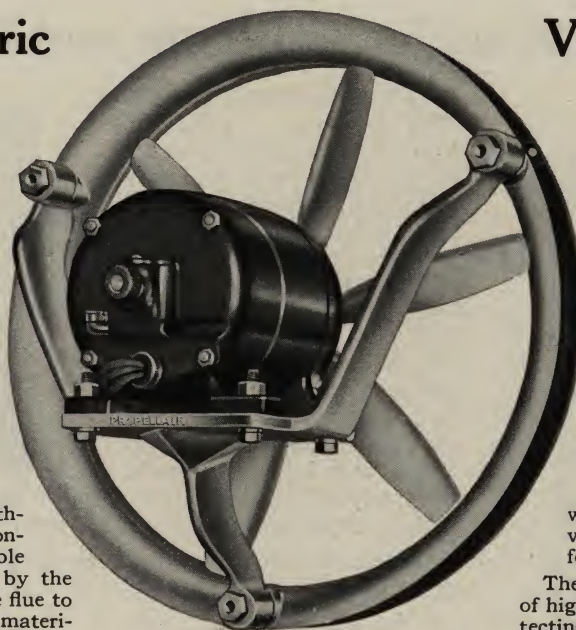
THE Starline exhaust fan was designed by one of the leading aeronautical engineers in this country. The six segmented airplane propeller blades have three distinct advantages.

First, the six blades made it possible to build up a higher static pressure very rapidly and promptly lift the protecting louvres into a wide open position.

Second, the use of the airplane propeller blade has the unique advantage of building up the static pressure to a certain point without increasing the power consumption which makes it possible to control the volume of air by the use of dampers in the outtake flue to any desired extent, without materially affecting the load on the motor.

In actual use the motor load drops and current consumption becomes less as the volume of air moved is cut down. Current consumption is lowest at the time when the dampers are closed and when there is practically no air discharge. This obviates the possibility of motor ever burning out in event the louvres or dampers should stick shut. With the flat or bucket shaped steel stamped blade this condition would be reversed—the load on the motor would build up when the dampers are closed, or in the event the louvres or dampers should stick shut, would cause the motor to burn out.

The third advantage is that the unique propeller design maintains the uniform velocity of air movement across the entire cross section of the exhaust opening. This greatly increases the volume of air moved in pro-



Ventilating Fan

portion to the amount of current consumed; it first reduces the duct resistance which with most fans is very considerable since they force their air to the outside along the wall.

It is also possible to move a much larger volume of air per minute through a 12 in. duct because the air movement is just as rapid in the center as it is near the outer edges.

Because of the unique design and efficiency of the fan and the motor by which it is driven, the Starline ventilating fan removes 898 cu. feet of air for each watt hour.

The motor used is a standard make of high quality with a sealed case protecting it from moisture, acid or alkaline fumes. The standard rating is

1-20-horse power and it consumes about 72 watts on free discharge.

The motor is mounted on a sturdy stream line cast aluminum 3-point suspension frame. This frame is fastened to the cast aluminum mounting ring with three hollow bolts. The fan itself is then fastened to the wall or louver frame by the use of other bolts passing through the hollow bolts just mentioned.

The propeller blade tip extends to within a few thousandths of an inch of the fan rim. This feature makes it impossible for the air to short circuit or return around the propeller tip to equalize the negative pressure directly back of the blade.

The third feature of the rounded or curved rim or entrance which offers no resistance to the flow of air, as shown in the following diagrams.

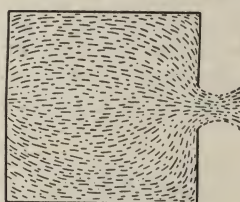


Figure 1—The action of the air forced through a square edged outlet without curved entrance is such that the stream contracts to 62% and cuts down the air flow to that extent as shown.

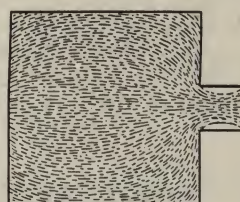


Figure 2—In the illustration above the area of the outlet is the same as in Figure 1, but a cylindrical nozzle guide has been added, which increases the air flow to 82%.

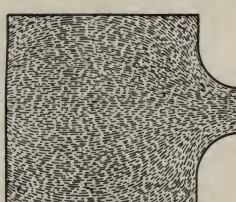


Figure 3—This has the same outlet as Figures 1 and 2, but the flow is increased to 99% of the area by having rounded or curved entrance.

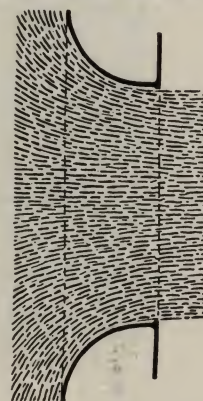


Figure 4—This shows the construction of the fan ring, which is similar in design to the outlet shown in Figure 3.

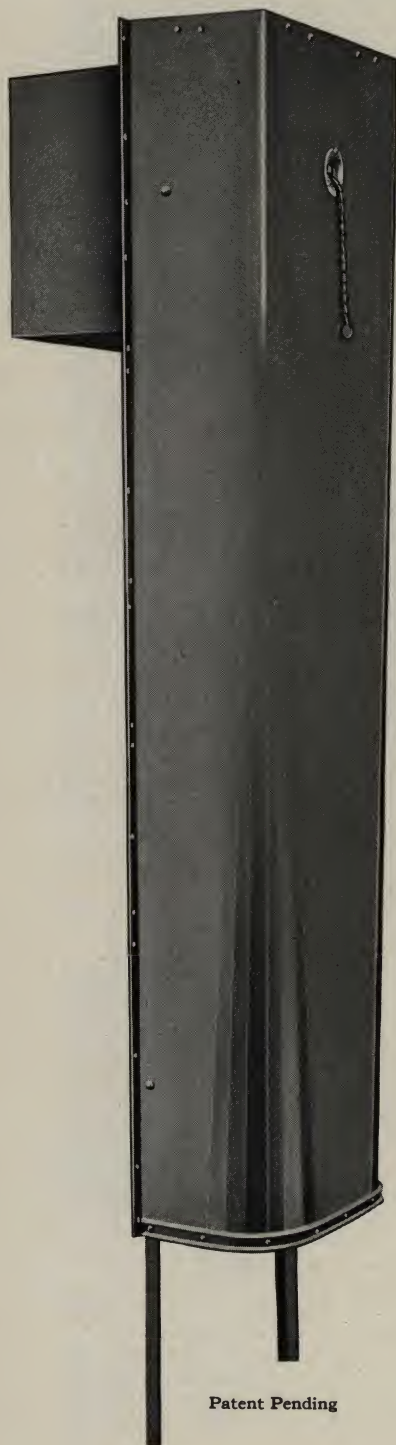
Above figures explain why the Starline Fan moves the greatest amount of air with the least power.

The hood mounted outside also increases the efficiency of the fan, as the fan actually exhausts into an area of negative pressure caused by wind blowing across this opening. By use of this hood the wind can never force or hold the louvres shut. In fact, wind blowing across the bottom of the hood opening actually increases the efficiency of the fan.

The louvres themselves also increase the fan efficiency by acting as deflecting vanes which turn the air current downward without a decrease in the effective opening.

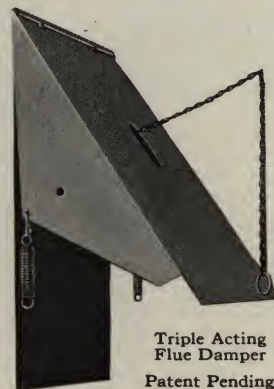
The motor has to be oiled only once in six months even when the operation is continuous. Motors are furnished for direct current 32, 115 or 230 volts and for alternating current, 60 cycle, single phase or polyphase, 110 or 220 volts.

Starline Stable Flue Is Simple and Efficient



Patent Pending

STARLINE Stable Flue is made of 20-gauge copper alloy steel 17 inches wide by 8½ inches deep and reinforced with heavy channel steel at the bottom and with the top corners reinforced with heavy 18-gauge corner braces. It is "D" shaped at the bottom to provide that rugged strength necessary to stand without serious damage the effects of being bumped into by a cow or by a feed truck, but squared at the top to permit the operation of the close fitting, triple acting control damper.



Triple Acting
Flue Damper
Patent Pending

The flue itself is 7 ft. 4 in. long. Legs are adjustable to height of fan opening.

Draws Air from Above or Below

It is open at both top and bottom so that air can be drawn off the floor without draining the animal heat out of the stable too rapidly or off the ceiling when the stable gets too warm for the most profitable results.

This flue sets flat against the wall, the flanged edges provided for firm anchorage along the entire length of both sides. A square box 15 in. x 15 in. projects 7 inches from the back of the flue into the square opening in the wall.

Fan Can Scarcely Be Heard in Barn

The fan being mounted in a frame which fits the outer end of this same wall opening, has no direct connection with the flue itself. The fan is independent of the flue so the flue cannot take up and magnify the quiet purr of the fan into an objectionable noise. Because of this arrangement it is practically impossible to hear the fan except when standing very close to the flue.

Triple Acting Damper Controls Air Flow

The fan draws from above or below according to the position of the triple acting control damper mounted in the flue opposite the fan opening.

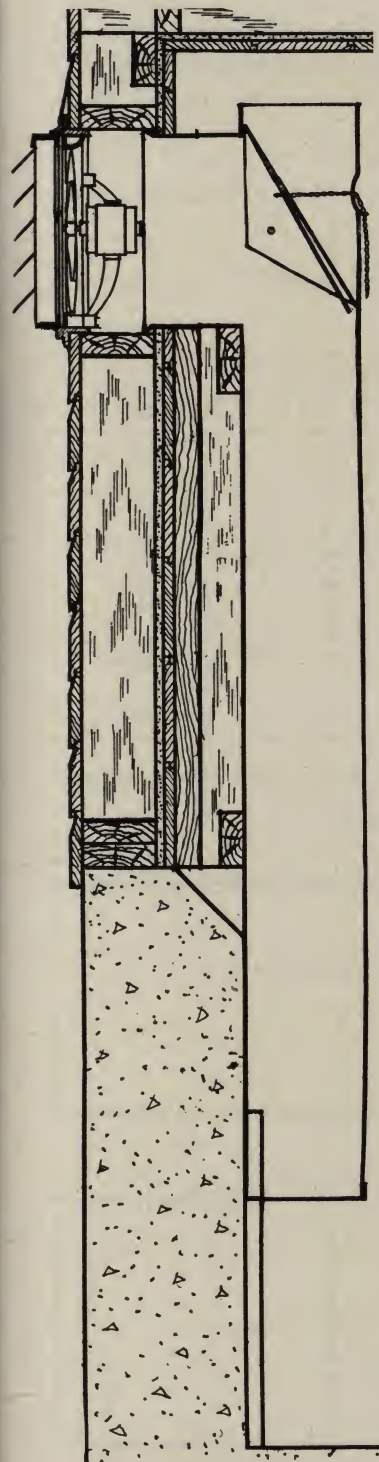
A pull of the chain opens the damper to the desired width and position. It locks in position when the chain is dropped.

The fan opening can be closed by releasing the chain; springs attached to both sides of the damper pull it shut.

Triple Acting Damper

When the chain is pulled out it opens the damper and sets it in any of the positions shown on the opposite page.

How Triple Acting Damper Controls Air Conditions



WHILE the thermostat can be set to stop the fans when the stable gets *too cold* it is important to regulate the air condition in the temperature range above that which causes the thermostat to call a halt.

The simple parts which take care of this are shown in the sectional drawing at the left which indicates the relative positions and locations of Fan, Louvres, Flue and Control Damper.

The control damper makes it possible to regulate the air flow to take whatever care should be taken to conserve the heat, so that ventilation may be continuous even in the coldest weather. It also makes it possible to graduate the amount of cold or warm air taken out in average temperature conditions and to purposely and deliberately draw out heat when heat becomes excessive.

The first diagram at the right shows damper closed. Practically no air can get out when the damper is closed though the fan may be running at full speed. The current load when the damper is closed is below current rating.

Maintain Air Condition in Spite of Extreme Cold

By opening the damper just a little as shown in diagram No. 2 the flow of air is cut down so that it may continue to carry out moisture and dead air but exhaust very little heat. This is where to set the damper for a cold night. The thermostat stops the fans and everything will close up tight if it gets too bitter cold—and ventilation will start again when the barn warms up enough to allow ventilation.

To Use Full Capacity and Save Heat

No. 3 shows normal position for moderately cold weather—running at full capacity but taking air off the floor so heat will not be drawn off and wasted.

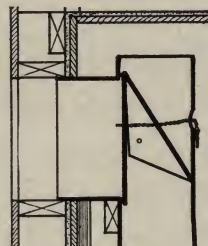
Making Temperature Slightly Lower

Diagram No. 4 shows the damper in vertical position to take both cold air off the floor and warm air off the ceiling.

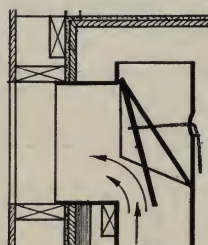
To Cool Barn Without Danger

The position taken by the damper with the chain pulled all the way out, as shown in diagram No. 5, allows the fan to draw all the air from the ceiling. It not only takes out the maximum of moisture but the maximum of heat. No matter how warm the barn is, the animals are warmer. The heat from them floats to the ceiling, and spreads to the nearest outlets. The barn can be cooled faster by opening doors and windows, but think what cold drafts will do.

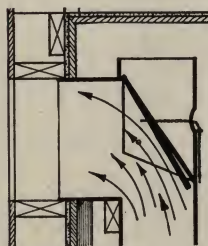
So, when the barn is so warm you feel like throwing everything wide open—pull the chain on the stable flue. The change will be gradual—but certain—and safe.



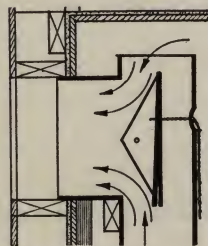
No. 1 Closed



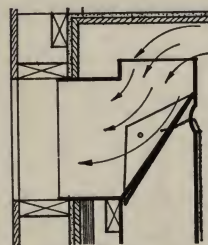
No. 2 Half Open Below



No. 3 Wide Open Below



No. 4 Damper Vertical



No. 5 Top Open Bottom Closed



How to Figure Amount of Electrical Ventilation

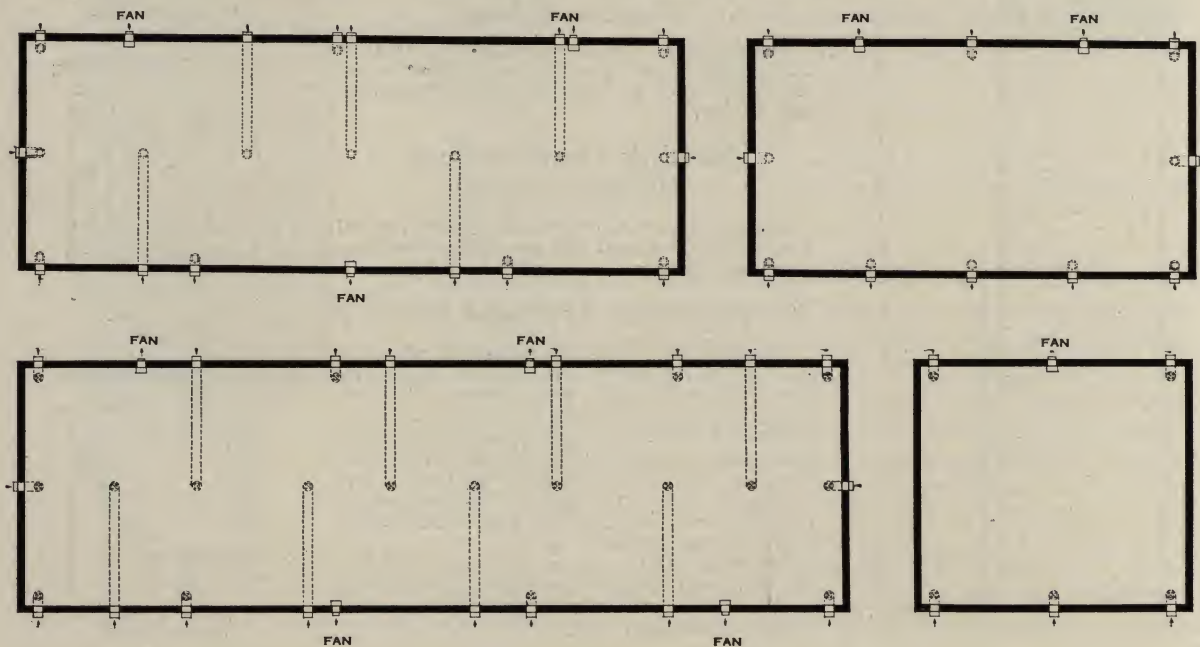
AT a minimum cost for electric current in proportion to the amount of dead air and moisture withdrawn from the stable, the Starline Ventilating Fan will remove enough air to provide for the maximum requirements of seventeen cows.

Five Intakes likewise provide for the maximum requirements of seventeen cows so that one fan used in connection with five intakes will provide all the ventilation that is required by seventeen cows.

Ventilating equipment required by herds of other sizes is shown in the following table.

Cows	Fans and Flues	Intakes	Cows	Fans and Flues	Intakes
3	1	3	40	3	12
7	1	3	43	3	13
10	1	3	47	3	14
14	1	4	50	3	15
17	1	5	54	4	16
20	2	6	57	4	17
23	2	7	60	4	18
27	2	8	70	4	21
30	2	9	80	5	24
34	2	10	90	5	27
37	3	11	100	5	30

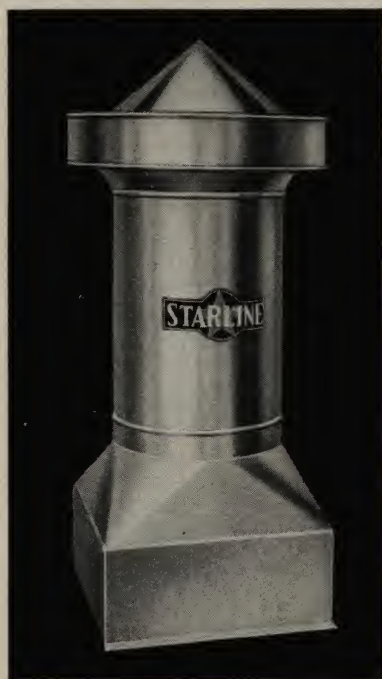
Intakes should be arranged so as to provide the greatest possible distribution and diffusing of air. Below are shown several typical arrangements.





Taper Base on Ridge

Extra charge for ornaments and weather vane with cow, hog, horse or rooster.
Extra charge for cutting to pitch of side roof.
Be sure to give pitch when ventilator has to be cut to pitch.
Lightning Rod attachments charged extra.



Square Base

Starline Taper Base Ventilators

STARLINE taper base ventilators shown herewith are of the same efficient design and sturdy construction that have made Starline Barn Ventilators favorites throughout the country.

They are generally used on hog houses, poultry houses or other buildings smaller than the main barn. They can be set on the side of roof or on the ridge as desired. When ordering be sure to specify whether they are for ridge or side roof and if for side roof give pitch of roof.

Furnished in the following sizes:

No.	Flue	Wt. Lbs.
No. 12	12-in.	45
No. 16	16-in.	55
No. 20	20-in.	65
No. 24	24-in.	100
No. 30	30-in.	150
No. 36	36-in.	195



Taper Base on Side Roof

Long Neck Ventilators

Recommended for use on poultry houses and other low buildings.

No.	Flue	Wt. Lbs.
No. L12	12-in.	60
No. L16	16-in.	65
No. L20	20-in.	80



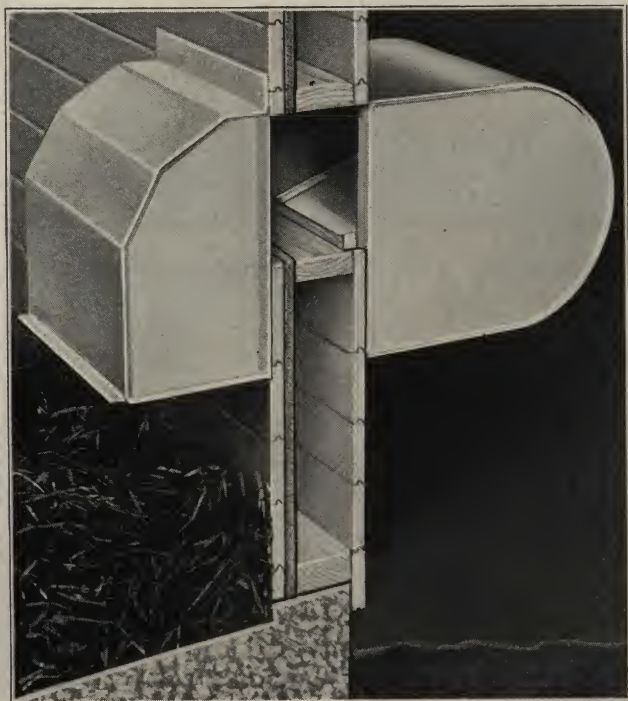
No. L12 Long Neck Ventilator

Square Base Ventilators

These are offered for use on small buildings where an inexpensive ventilator is desired. Made with long neck as illustrated at the left or with short neck.

No.	Flue	Wt.
No. 112 Short Neck	12-in.	45 lbs.
No. L112 Long Neck	12-in.	55 lbs.
No. 116 Short Neck	16-in.	45 lbs.
No. L116 Long Neck	16-in.	60 lbs.

No. 1281 Starline Fresh Air Intake for Poultry Houses



No. 1281 Starline Fresh Air Intake

The diagram at the right shows an arrangement in which the outside control box containing the damper is installed near the top of the wall.

The control box may be placed at any desired height because the air coming in passes down through the wall between the adjacent studding and goes into the building through the inside hood. The location of the inside hood, however, is very important for the reason that the cold, dry air from outside should be brought in near the floor—as near to the floor as possible without interfering with the free movement of the incoming current of air.

The bottom of the inside hood should be just about 12 inches above the floor, so the inside wall opening is made 18 inches above the floor.

Placing the outside valve box at a point higher than the inside wall opening is sometimes necessary where the back of a poultry house or one end is built into the side of a hill or where snow might pile up and interfere with the operation of the intake.

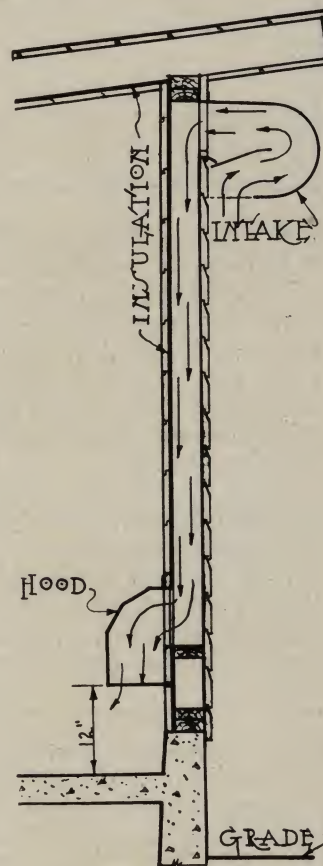
The damper in the control box automatically regulates the size of the opening with relation to the speed of the air coming in so that the same amount of air enters the building through every intake in a system regardless of the direction or speed of the wind.

Intake assembly complete includes control box with damper, valve and inside hood. Shipping weight 10 lbs.

THE Starline Fresh Air Intake which is used in poultry houses is shown in the accompanying illustrations.

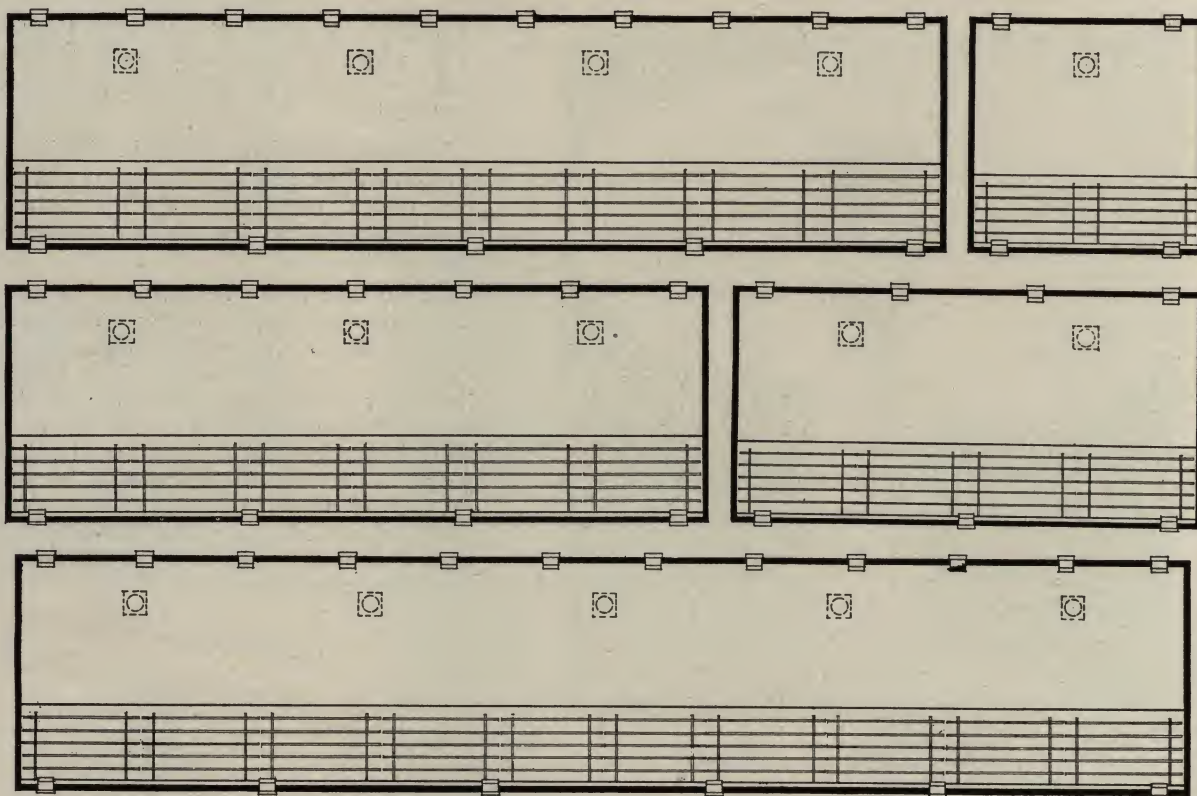
When installed as shown in the illustration at the left an opening is cut in the siding measuring $13 \times 7\frac{5}{8}$ inches. A similar opening is cut in the inside sheathing.

The intake is in two parts. The control box, containing damper and valve, is applied to the outside opening as shown in the illustration. The inside hood covers the opening inside of the wall. The incoming air is entirely controlled by the valve box outside, the purpose of the inside hood being to deflect the current of air so that it flows gently down into the litter to carry off any dampness that the litter might otherwise absorb.





Starline Poultry House Ventilation



THE above diagrams show typical arrangements of ventilators and intakes to get the greatest amount of diffusion.

Note that where four or more intakes are used one is placed as near to each of the four corners as possible. The other intakes being distributed evenly along the walls with proper relation to the location of the ventilators and outtake openings.

Where a poultry house is separated by partitions the ventilation of each room becomes a separate proposition.

Note that the Starline Long Neck Ventilator is shown in the illustration on page 124.

The long neck ventilator provides a better draft than the lower types of ventilators.

Note also that there is a damper flue extending from the bottom of the ventilator to the under side of the ceiling.

This damper should remain wide open so as to benefit by the full capacity of the ventilating system except in severely cold or wet weather.

The continuous process of taking out warm air and bringing in cold air from the outside tends to keep the inside of the building cooler than it otherwise would be.

When the weather becomes extremely cold the ventilators should be at least partially closed so as to cut down the air change and prevent the inside of the building from cooling too quickly.

Complete prices on ventilation equipment are furnished on request without charge or obligation. Just send in a rough sketch with dimensions, indicating the size of the floor, mentioning the height and kind of walls and the number of birds kept in the room to be ventilated.

No. 2028 Ventilating Wall Window

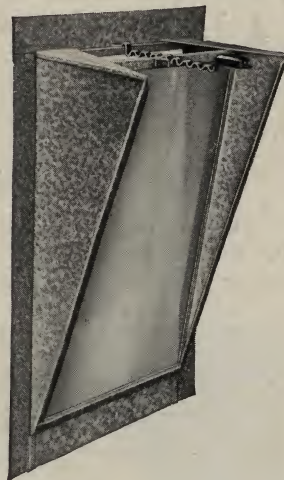
THIS simple and inexpensive ventilating window is suitable for barns, poultry houses, hog houses or other frame buildings.

Frame and wings are made of 26-gauge copper steel. The ribbed glass measures 20x28 inches and is $\frac{3}{16}$ inch thick.

The latch permits glass to be tilted into eight different positions to suit the weather and locks the window securely when closed.

Overall size of frame $25\frac{1}{2} \times 33\frac{3}{4}$ inches. Depth of wing $9\frac{1}{4}$ inches.

Packed 6 frames in carton; weight, 45 lbs.; six lights of glass in a wooden box; weight 80 lbs.



Revolving Head Ventilator

THIS ventilator with revolving head is made in three sizes: 12 in., 18 in. and 24 in. The material is heavy, galvanized copper bearing steel finished with silver aluminum paint.

Base can be fitted to any style of roof.

Revolving head is perfectly counter balanced, fitted with a ball bearing in the lower part of the cupola where the warm air drawn from the building passes directly over the bearing before it goes out. This eliminates the common fault of the bearing getting stuck in cold weather.

No. 12—12 in. flue, 16x16 in. base, 36 in. high, one in a carton. Weight 23 lbs.

No. 18—18 in. flue, 24x24 in. base, 54 in. high, one in a crate. Weight 55 lbs.

No. 24—24 in. flue, 30x30 in. base, $6\frac{1}{2}$ ft. high, one in a crate. Weight 154 lbs.



Windows With All Steel Frames and Sash

THE windows illustrated on this page are made with all steel frames and sashes. They are complete with window guards or wings and require no other fittings or hardware.

The glass used has a ribbed surface which deflects the sunlight at all angles. Tests show that this ribbed glass admits approximately 30% more light than the ordinary clear glass with a plain surface.

For Wood Walls

The All Steel Side Wall Window for wood is very similar in construction to the same window for tile. The only difference being the flange that is turned out on the front edge. Nailing through this flange holds the frame securely in position.



The method of installing is very clearly shown by the illustration at the left. After an opening has been left in the sheathing, the frame is placed in position and nailed through the flange to the sheathing, later the flange edge is covered with the wood casing of the window. The installation is very permanent and offers the opportunity of making a very neat, tight job.



This glass is $\frac{1}{4}$ -inch thick and solidly set in the sash. Furnished in the following sizes, packed six of one size in a package:

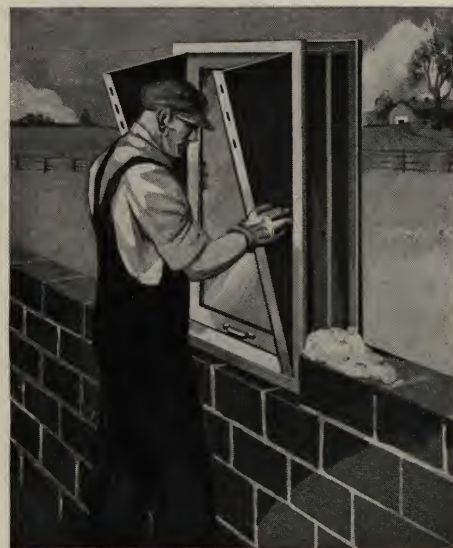
No.	Glass Sizes	Frame Sizes	Wt. Pkg. of 6
KW101	17 x 25	24 $\frac{1}{2}$ x 33	200 lbs.
KW102	23 $\frac{1}{2}$ x 25	31 x 33	230 lbs.
KW103	23 $\frac{1}{2}$ x 30 $\frac{1}{2}$	31 x 38 $\frac{1}{2}$	250 lbs.
KW104	23 $\frac{1}{2}$ x 36	31 x 44	295 lbs.

For Tile Walls

The installation of Side Wall Windows in a tile wall is very simple. When tile is built up to the level where the windows are to be placed, a bed of mortar is laid on the tile and the windows are forced down into it, on the tile. This makes a tight job and anchors the window in position. Then the tiles are laid along the side of the window, and as the tile wall builds up, the open space between the tile and the window is filled with mortar, completely sealing the installation. Well constructed from a good grade of steel, they will never shrink, warp, or dry out. For this reason they are much superior to wood as a barn window frame.

The glass is $\frac{1}{4}$ -inch thick and solidly set in the frames. Furnished in the following sizes, packed six of one size in a package:

No.	Glass Sizes	Frame Sizes	Wt. Pkg. of 6
KT101	17 x 25	24 $\frac{1}{2}$ x 33	200 lbs.
KT102	23 $\frac{1}{2}$ x 25	31 x 33	230 lbs.
KT103	23 $\frac{1}{2}$ x 30 $\frac{1}{2}$	31 x 38 $\frac{1}{2}$	250 lbs.
KT104	23 $\frac{1}{2}$ x 36	31 x 44	295 lbs.



Star Window Guards Regulate Window Ventilation



Fig. 721

STAR Window Guards Deflect the Fresh Air to the Ceiling

If you want a little air, the bolt will hold the window in such a position that you get the desired amount. If you want a lot of air, the same thing holds true. In other words, window ventilation is absolutely under your control when you are equipped with STAR Window Guards.

Star Window Guards are furnished galvanized, weight, per set, 6 lbs.

A LITTLE study of the two illustrations of STAR Galvanized Window Guards will reveal one important feature which will make you choose them in preference to all others.

These guards are fitted on the side with a bolt, which has projecting prongs.

These prongs enable you to lock the window open as far as desired.

Latch is not included with Window Guards.



Fig. 740

STAR Window Guards Hold each Window Open any Distance Desired



No. 822 Star Sidewalk Scraper



THE STAR Sidewalk Scraper has a blade of heavy pressed steel, firmly bolted to the malleable iron frame which fastens it to the handle.

The blade is so curved that when handling slush or snow up to four or five inches deep, a good, vigorous push will send the snow beyond the edge of the walk.

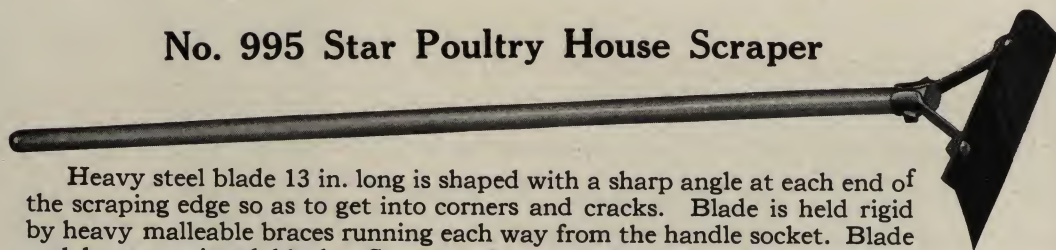
The blade is so shaped that the scraper can also be operated by pulling. The illustration at the left shows a scraper being pulled, and the small, round picture at the right shows the same scraper in position for pushing. Handle 5 ft. long, $1\frac{1}{4}$ in. thick.

The blade is 18 inches long and the scrapers, complete with handles, weigh 7 lbs. each.



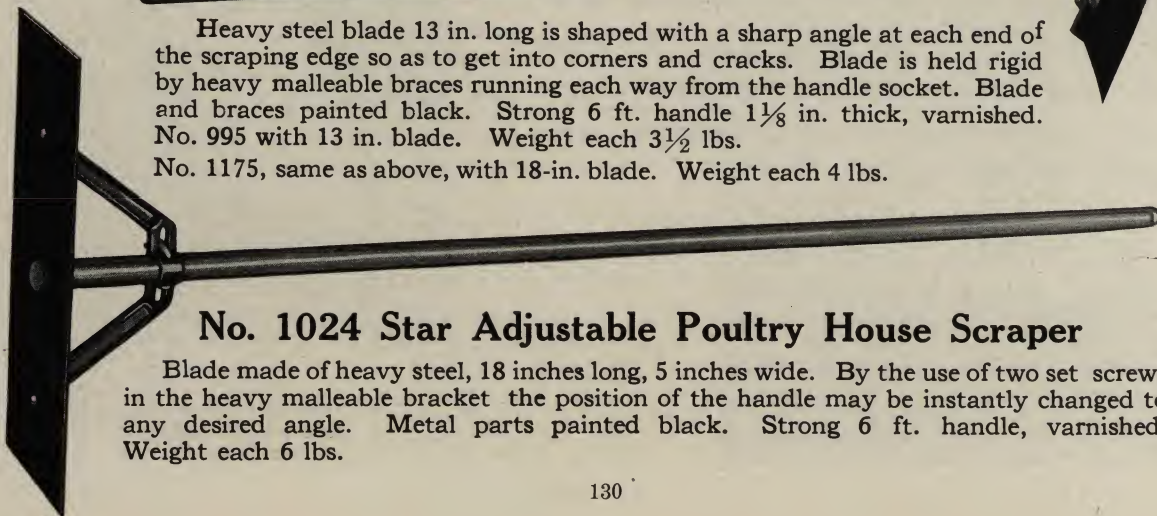
Fig. 822

No. 995 Star Poultry House Scraper



Heavy steel blade 13 in. long is shaped with a sharp angle at each end of the scraping edge so as to get into corners and cracks. Blade is held rigid by heavy malleable braces running each way from the handle socket. Blade and braces painted black. Strong 6 ft. handle $1\frac{1}{8}$ in. thick, varnished. No. 995 with 13 in. blade. Weight each $3\frac{1}{2}$ lbs.

No. 1175, same as above, with 18-in. blade. Weight each 4 lbs.



No. 1024 Star Adjustable Poultry House Scraper

Blade made of heavy steel, 18 inches long, 5 inches wide. By the use of two set screws in the heavy malleable bracket the position of the handle may be instantly changed to any desired angle. Metal parts painted black. Strong 6 ft. handle, varnished. Weight each 6 lbs.

No. 831 Star Floor Scraper

HERE is a big work saver in cleaning the barn floor. Every barn owner wants one. It's exactly what you want in *your* barn.

It is made with a blade of heavy high-carbon steel firmly attached to a long, well balanced handle. The handle socket and braces are made of the best grade of malleable iron.

The STAR Floor Scraper will last twice as long as the ordinary scraper. The steel blade is reversible. After one edge has become worn down, remove the blade, tip it over, attach it to the handle and you have a new scraper. You really have two scrapers in one.

Handle is varnished; blade painted black. Furnished either 15 or 24 inches wide. Handle 5 ft. long, 1¼ in. thick.

You will find the STAR Scraper especially convenient for cleaning off the approach to the barn door. A mighty handy tool in clearing away snow in winter time.

Extra blades for STAR Scrapers can be furnished if desired.

For cleaning the floors of your barn, you will find nothing so convenient as the STAR Floor Scraper. It is especially adapted to cleaning the gutters, too.

It is also handy for cleaning sidewalks or streets or any place where a scraper is used. Made in two sizes. No. 831—24 in. wide.

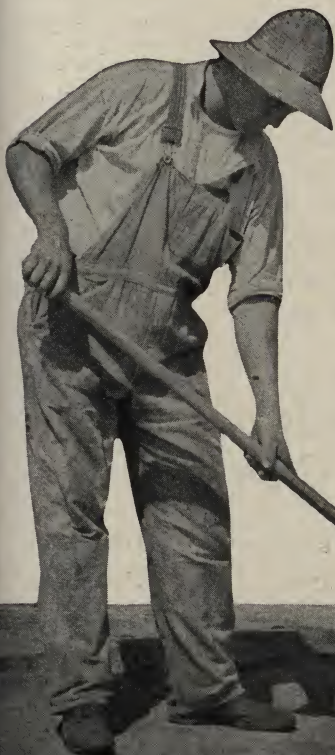
Weight 8 lbs.

No. 832—15 in. wide.

Weight 6½ lbs.



Fig. 831 STAR Floor Scraper



Special Features About Star Litter Carriers and



ALMOST any litter carrier is a good investment. It's a labor-saving device that is needed in every barn.

But, there's a difference in litter carriers just as there's a difference in other barn equipment.

A litter carrier should give long service. Even tho it saves its cost over and over, there is no reason why a litter carrier should not give many years of good hard service.

STAR Litter Carriers are built to last. They are simple, which means less likelihood of getting out of order. They are extra strong, which means withstanding long, severe service. They are built with every sensible feature for convenience of operation. They are in a variety of types to suit the purchaser's needs. And they are backed with years of experience and the broadest, iron-clad guarantee.

Just remember this one point. We have never heard of any farmer who would take a STAR Carrier out of his barn for the price he paid for it.

Two Kinds of Star Litter Carriers

Regardless of the arrangement of the barn you can get a STAR Carrier adapted to its needs. No barn arrangement is so complicated but that a STAR Carrier can be made to work in it successfully.

To meet every need, two distinct lines of STAR Carriers have been designed, and are fully illustrated and described in this catalog.

Why Farmers Prefer Them

1. Those to operate on STAR Double Angle Steel Track both in the barn and outside, using either swinging booms or stationary track in the yard.

2. Those to operate on STAR Double Oval Steel Track in the barn and Rod Track in the yard or on Rod Track in both yard and barn.

SIMPLE, SERVICEABLE, SECURE—STAR Carriers are simple, practical and durable. Each individual part of the Carrier is built for service and will stand the weight or strain placed upon it in use.

QUICK HOIST—The tub is raised by an endless chain running over the main drive wheel operating the shaft. The lifting power afforded by the drive wheel, and the tripple purchase effect secured by the chain running under the pulleys at each end of the bail, makes it easy to raise. This device works rapidly, raising the tub in one-third the time ordinarily required.

It can be instantly changed to double purchase to speed up light work.

RAPID LOWERING—The tub may be instantly lowered by pulling the trip chain, and allowing it to descend freely to any point desired. You do not have to work to lower the tub; it drops of its own weight, controlled by the hand chain.

THE STAR CHANNEL BAIL—The channel bail serves two purposes—it protects the tripping mechanism so that it cannot get out of order, and gives great strength and rigidity to the tub. The carrier tub is held rigidly by latches in the bail, these latches locking both ends of the tub. A chain running in the groove of the bail connects each latch with the double eye tripping lever on top of the bail. The tub can be unlatched only by pressure on this lever. Both latches lock and unlock simultaneously, allowing the tub to dump either way.





Reproduced from Actual Photograph of the

No. 333 Star Litter Carrier

Full Roller Bearing for STAR Double Angle Steel Track and Swinging Boom

THOUSANDS of No. 333 Carriers like the one shown above have been in use for years, have paid for themselves many times over and are still good for many more years of valuable service.

Their simple, sturdy construction makes them last longer and work easier.

They work on a center-hung track so the wheels run true and straight—without any

side pull. The hoisting shaft is a simple windlass without cogs or gears; the drive wheel is bolted to the end of the shaft. A pull of one pound on the chain raises six pounds of load. It is the quickest to raise and lower.

The tub is strongly braced and reinforced. It locks at both ends, in the channel steel bail. This prevents twisting or straining the tub and lengthens its life.

No. 333 Star Litter Carrier

(Continued)

SPECIFICATIONS

DOUBLE ANGLE STEEL TRACK—described on page 144.

LAG SCREW HANGERS for Double Angle Steel Track—described on page 145.

SWIVEL TRACKER WHEELS—affording a double bearing on the track; diameter $4\frac{1}{2}$ inches. Each Tracker Wheel operates on 12 extra long, cold rolled steel bearings surrounding a shouldered axle pin of special hardened steel.

MALLEABLE SUPPORTING BRACKETS—connected to the trucks by heavy cold rolled swivel heads.

HORIZONTAL SHAFT—on which the wrap chains wind. This shaft revolves in the supporting brackets which afford a four-point suspension, and turns on 76 cold rolled, hardened bearings contained in the supporting brackets.

FOUR-POINT SUSPENSION—The tub is suspended by wrap chains from four points on the shaft which gives not only a double purchase on the load but also eliminates end motion. The wrap chains are made of close link Machine Chain and will wind closely and neatly around the horizontal shaft without kinking or breaking.

CHANNEL BAIL—Holds tub perfectly rigid, protects the tripping mechanism and adds strength to the tub. Fitted with loops for holding hooks and pulleys for interchanging with feed carriers.

BAIL LATCHES—The tub is held rigidly upright by latches locking both ends. A chain running in the groove of the bail connects both latches with the tripping lever and operates them in unison.

CHAIN GUIDE—Malleable iron—keeps the hand chain in line with the main drive wheel and prevents it from jumping off.

TUB—Constructed of 18-gauge galvanized steel. Ends are of one piece with flanges formed on the edges, to which the body sheet is riveted.

The ends are reinforced with heavy galvanized plates; top edges of the tub are reinforced with galvanized angle irons both along the ends and sides; the corners are securely riveted, as is every joint in the construction of the tub. These tubs are indestructible; will not get out of shape, and are self-cleaning when dumped on account of the rounding bottom which permits of no corners in which litter can collect; the shape of the tub makes it possible to carry a larger load than with square or other shaped tub.

CLEARANCE REQUIRED BELOW TRACK

With No. 6 Tub upright, 42 in.; with Tub dumped, 48 in.
With No. 8 Tub upright, 47 in.; with Tub dumped, 53 in.

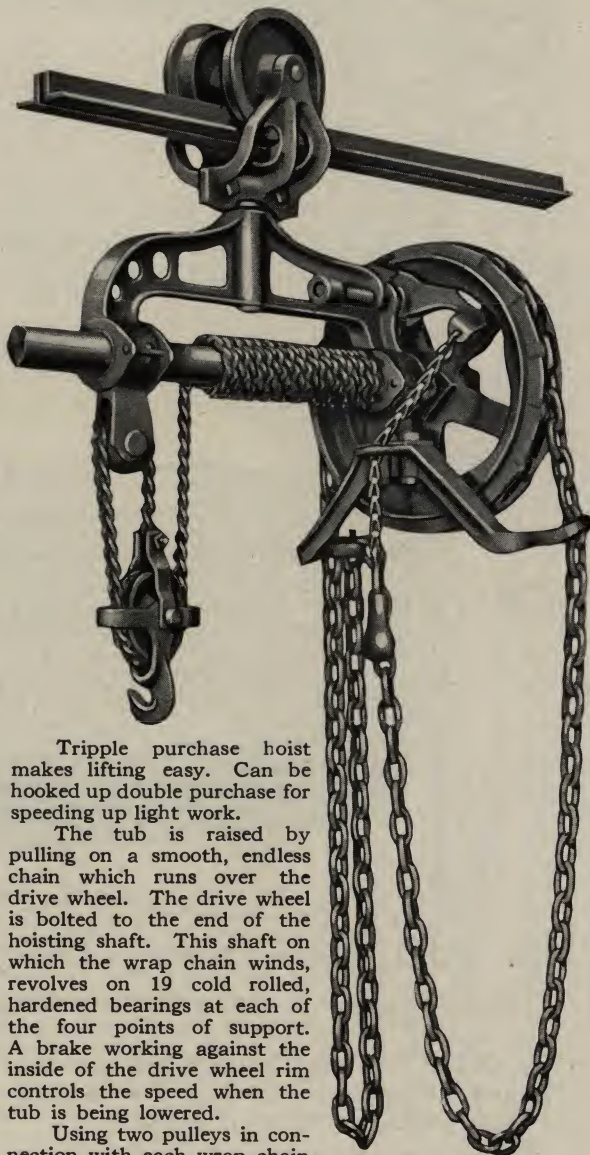
WEIGHTS AND SIZES OF TUBS

No.	Width	Length	Depth	Weight	Capacity
6.....	26 in.	40 in.	19 in.	95 lbs.	10 bu.
8.....	33 in.	40 in.	24 in.	130 lbs.	12 bu.

Conveyor only (without tub), 73 lbs.

SWINGING BOOMS—described and illustrated on pages 150, 151 and 152.

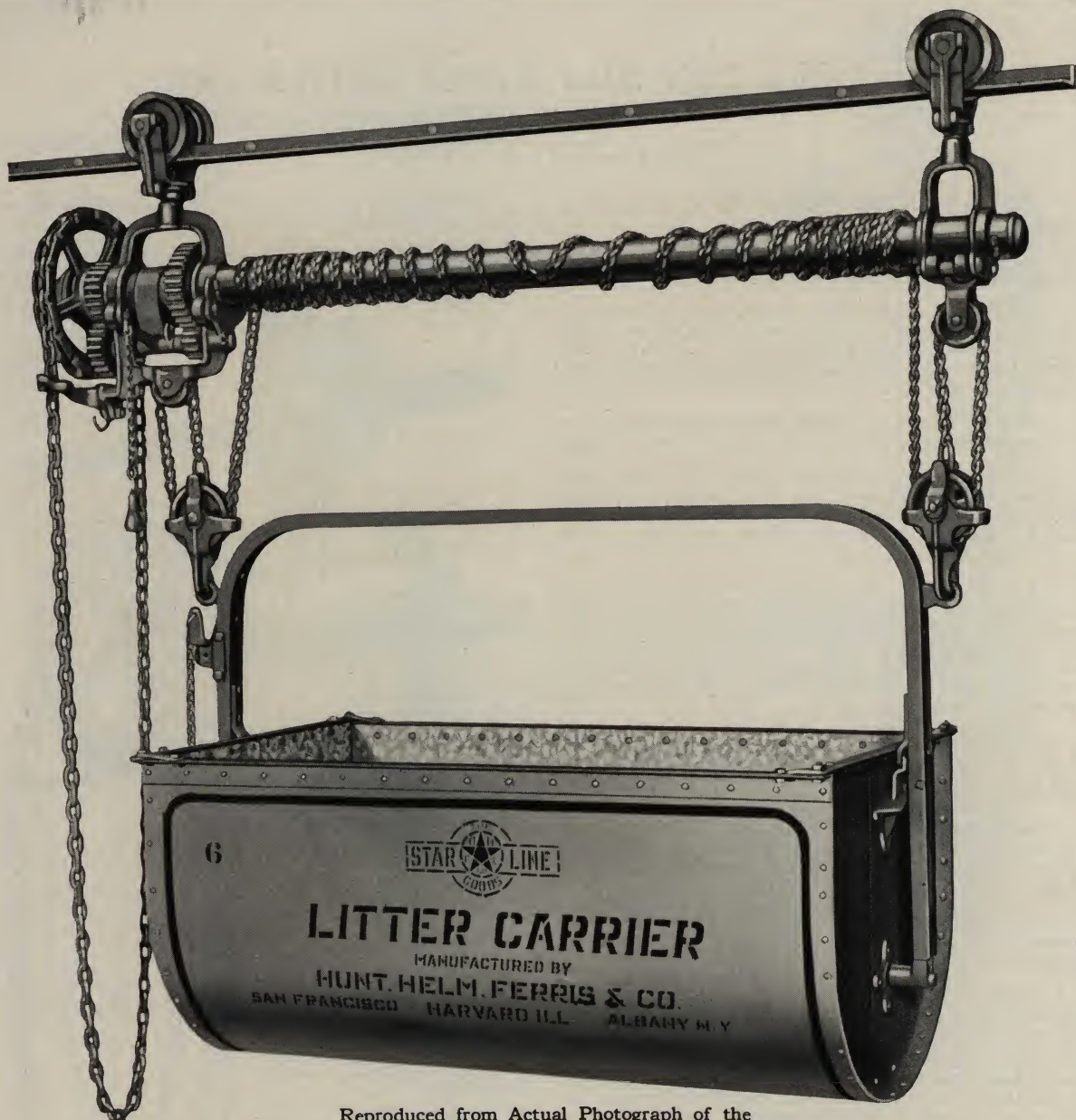
SWITCHES, CURVES AND OTHER ACCESSORIES are found on pages 146 to 157, inclusive.



Tripple purchase hoist makes lifting easy. Can be hooked up double purchase for speeding up light work.

The tub is raised by pulling on a smooth, endless chain which runs over the drive wheel. The drive wheel is bolted to the end of the hoisting shaft. This shaft on which the wrap chain winds, revolves on 19 cold rolled, hardened bearings at each of the four points of support. A brake working against the inside of the drive wheel rim controls the speed when the tub is being lowered.

Using two pulleys in connection with each wrap chain makes it much easier to raise the loaded tub. By moving the hand chain slightly to the right a link is caught in the chain lock as shown in the illustration and the tub held at any desired height. The chain is instantly released by a slight downward pull.



Reproduced from Actual Photograph of the

No. 930 Star Heavy Duty High Lift Litter Carrier

Extra Heavy Full Roller Bearing Carrier for STAR Double Angle Steel Track

THE No. 930 Litter Carrier is just as strong and substantial as it looks. It is designed especially for extra heavy work.

The illustration shows the carrier fitted with wrap chains for an ordinary five foot lift. By using longer chains the height of the lift can be increased to 12 feet. When the longer chains are wanted, specify No. 930-L.

Double gears with which the hoisting device is equipped make it possible to lift a heavy load easily and quickly. The tub shown in the illustration is interchangeable with the feed carrier tub shown with No. 334 Feed Carrier.

This is the most practical carrier to use where track has to be hung more than eight feet above the floor.

No. 930 Star Heavy Duty High Lift Litter Carrier

(Continued)

SPECIFICATIONS

DOUBLE ANGLE STEEL TRACK—described on Page 144. With this extra heavy carrier it is best to have lag screw hangers spaced not more than 18 inches apart, to give the track the additional rigidity and strength that is necessary to handle heavy loads for which this carrier is designed.

FLANGED TRACKER WHEELS—afford double bearing on both sides of the track; diameter $4\frac{1}{2}$ in. Each tracker wheel operates on 6 extra long, cold rolled steel bearings in a cage surrounding a $\frac{5}{8}$ in. shouldered axle pin of special hardened steel.

MALLEABLE SUPPORTING BRACKETS—are connected to truck by heavy rolled swivel heads.

HORIZONTAL SHAFT—on which the wrap chains wind, revolves on cold rolled hardened roller bearings contained in the supporting brackets. This horizontal shaft is $2\frac{3}{8}$ in. in diameter, which permits the use of an extra long hoisting chain.

FOUR-POINT SUSPENSION—The tub is suspended by wrap chains from four points on the shaft which give a double purchase on the load. These wrap chains are made of closed link machine chain which winds closely and neatly without kinking or breaking.

CHANNEL BAIL—Holds tub perfectly rigid, protects the tripping mechanism and adds strength to the tub. Fitted with loops for holding hooks and pulleys for interchanging with feed tubs.

BAIL LATCHES—The tub is held rigidly upright by latches locking at both ends. A chain running in the groove of the bail connects both latches with the tripping lever and operates them in unison.

TRIPPING LEVER—The latches hold the tub at each end and are released by pulling on the trip chain attached to the tripping lever.

TUB—Constructed of 18-gauge galvanized steel. Ends are of one piece with flanges formed on the edges, to which the body sheet is riveted.

The ends are reinforced with heavy galvanized plates; top edges of the tub are reinforced with galvanized angle irons both along the ends and sides; the corners are securely riveted, as is every joint in the construction of the tub. These tubs are indestructible and will not get out of shape; and are self-cleaning when dumped on account of the rounding bottom which permits of no corners in which litter can collect; the shape of the tub makes it possible to carry a larger load than with square or other shaped tub.

CLEARANCE REQUIRED BELOW TRACK

With No. 6 tub upright, 51 in.; with tub dumped, 57 in.
With No. 8 tub upright, 52 in.; with tub dumped, 57 in.

WEIGHTS AND SIZES OF TUBS

Tubs furnished in two sizes, as follows, outside dimensions.

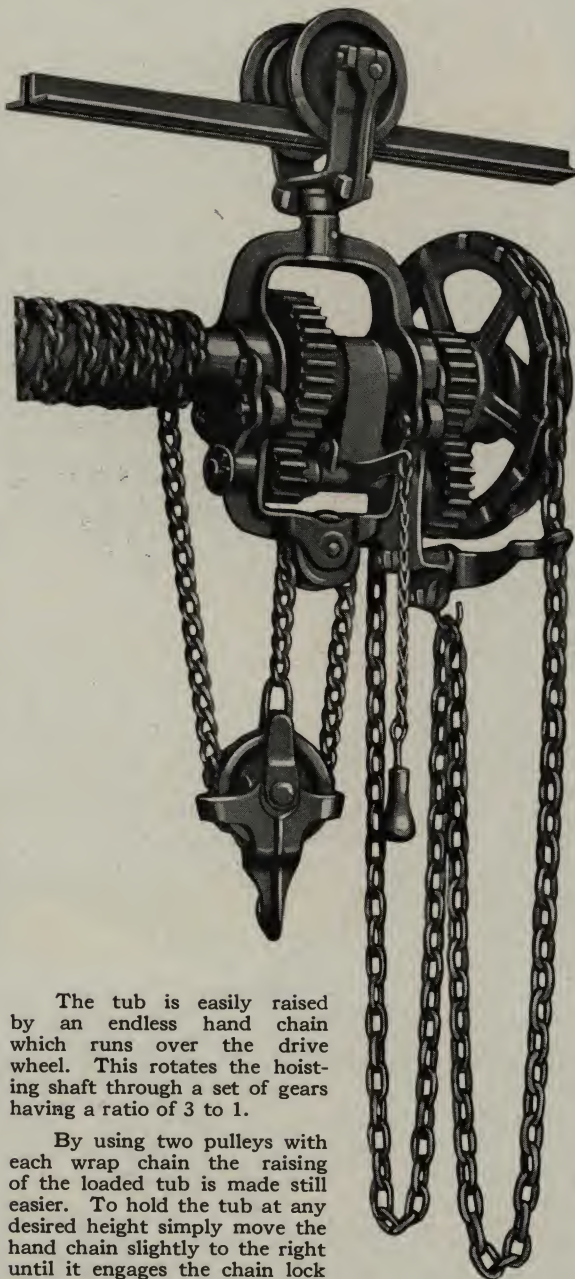
No.	Width	Length	Depth	Weight	Capacity
6.....	26 in.	40 in.	19 in.	95 lbs.	10 bu.
8.....	33 in.	40 in.	24 in.	130 lbs.	12 bu.

Add 100 lbs. for conveyor and hoist

SWINGING BOOM—Described and illustrated on pages 150 to 153, inclusive.

SWITCHES, CURVES AND OTHER ACCESSORIES—are found on pages 146 to 157.

No. 930 Star Litter Carrier, weight, not including tub, 125 lbs., finished in gray enamel.



The tub is easily raised by an endless hand chain which runs over the drive wheel. This rotates the hoisting shaft through a set of gears having a ratio of 3 to 1.

By using two pulleys with each wrap chain the raising of the loaded tub is made still easier. To hold the tub at any desired height simply move the hand chain slightly to the right until it engages the chain lock as shown in the illustration. A slight downward pull releases the chain and permits the tub to run down. The speed of the descending tub is controlled by a friction brake operating on the hoisting shaft.



No. 1272 Floor Truck for Starline Litter Carrier



THIS No. 1272 Star Floor Truck makes it possible to use a Starline Litter Carrier in a barn where the ceiling is too low to install a track or where, for any reason, the installation of a track is not desired.

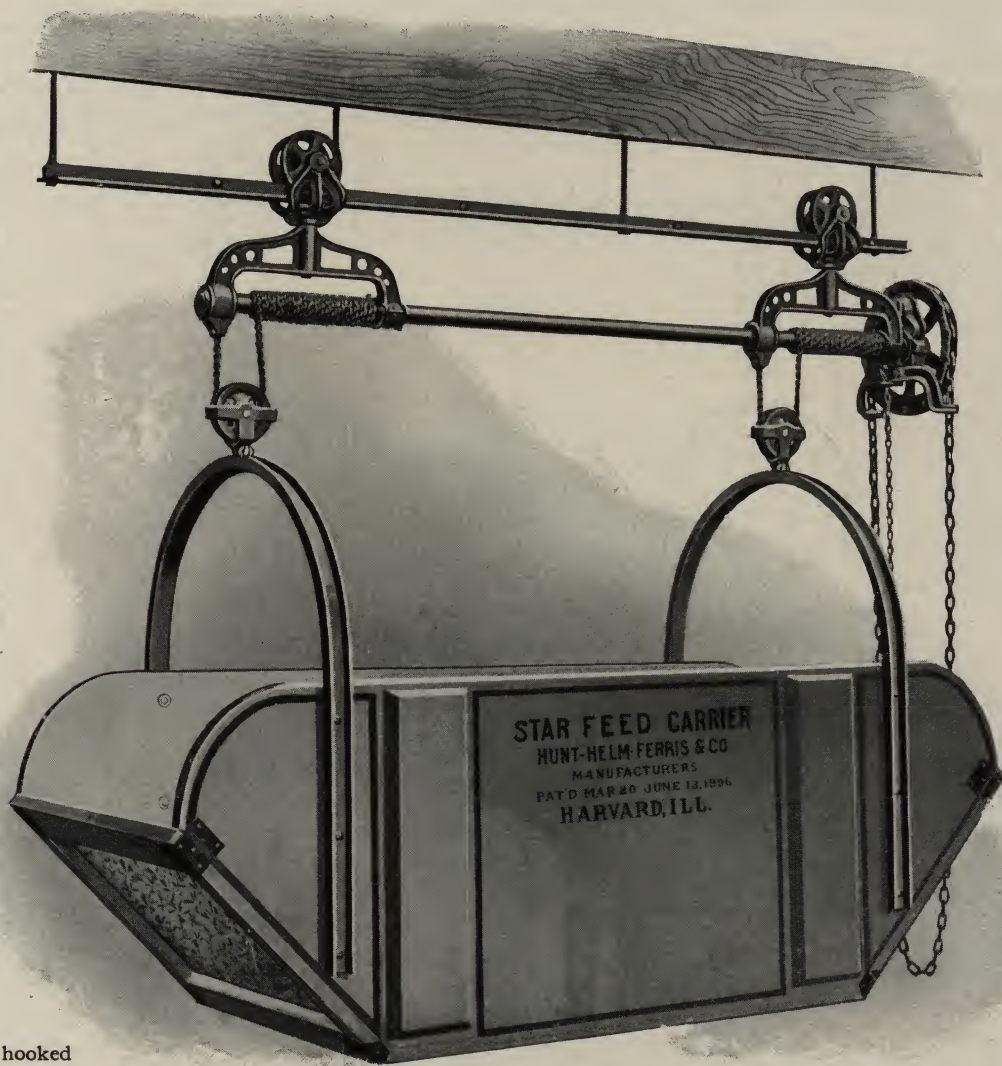
Two rigid 12-inch roller bearing wheels in front and two 6-inch roller bearing caster wheels behind make it easy to turn corners and place the carrier wherever wanted.

The caster wheels as well as the front wheels have crowned treads which makes the truck run much easier than if the tread was flat.

The saddle of the truck is the same size and shape as the bottom of the Starline Litter Carrier tub. It sets low so it cannot rock or tip.

The heavy hardwood slats which run lengthwise to support the bottom of the litter carrier tub rest on hardwood bolsters which are suspended between the heavy $1\frac{1}{2}$ -inch by $\frac{7}{8}$ -in. steel channel frame.

The handle, 32 inches high, is made of 1-inch pipe securely bolted to the channel steel frame as shown on the illustration.



Can be hooked up with triple purchase hoist at no extra expense.

Reproduced from Actual Photograph of the

No. 334 Star Feed Carrier

Full Roller Bearing, for Use on STAR Double Angle Steel Track

HOIST and truck are identical with those of the No. 333 Litter Carrier on pages 98 and 99. Heavy bails of channel steel $1\frac{1}{2} \times \frac{7}{8}$ inch are bolted to the tub. They extend almost to the bottom, reinforcing the sides which are made of the best selected wood, well seasoned and free from knots.

Tub ends and bottom are made of heavy galvanized steel securely bound and reinforced at sides and bottom. Ends slanted for easy shoveling.

The tub, measuring 68 inches long, 26 inches wide and 24 inches deep, holds 16 bushels, is easily raised, held at any desired height and lowered by its own weight. May be unhooked and replaced any time with litter tub.

Runs anywhere on Double Angle Track, curves and switches. Can also be furnished with trucks to operate on Double Oval track when so specified.

Weight of carrier with tub, 195 lbs.



No. 878 Star Drop End Feed Carrier

16 Bushel Capacity

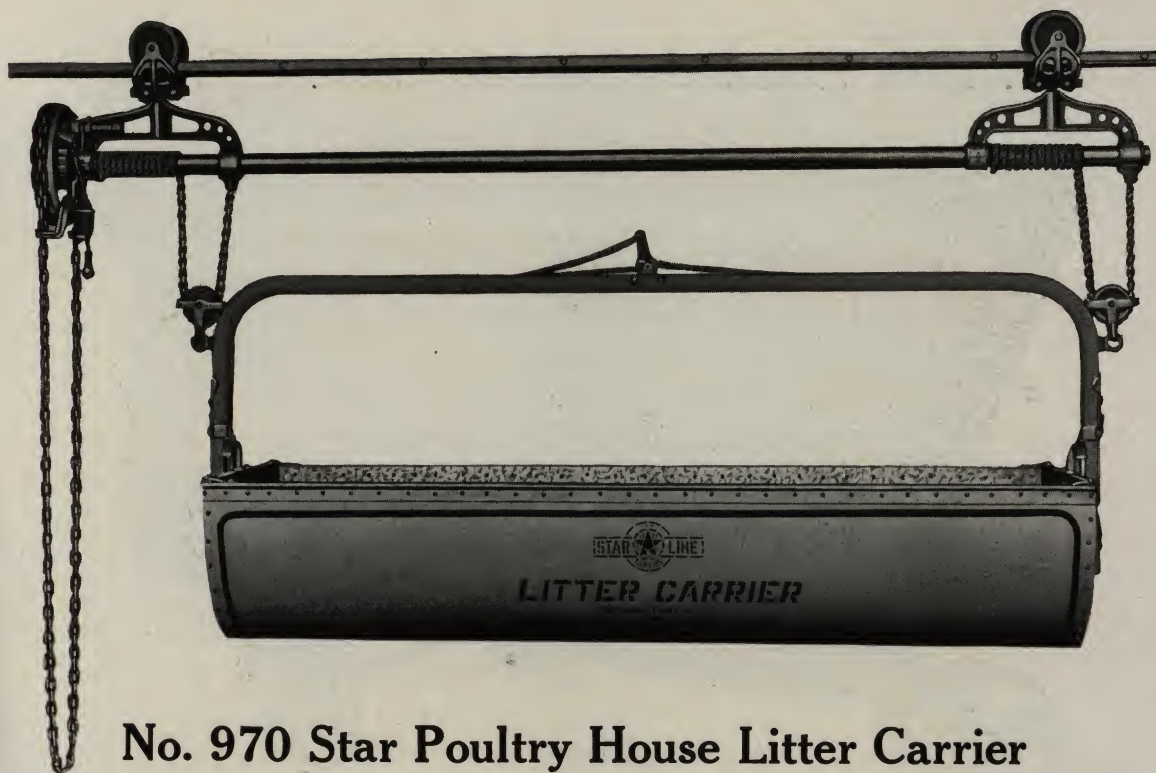
FULL roller bearing for use on Star Double Angle Steel Track.

Here's another style of tub which can be used with the conveyor and hoist shown in connection with the No. 333 Litter Carrier and No. 334 regular Feed Carrier on preceding pages.

It is just like the No. 334 Feed Carrier except that the ends are hinged and may be dropped down in line with the bottom of the tub for convenience in unloading.

A very handy double bolt locks and unlocks both sides of the end at the same time, holds it rigidly in place and prevents any twist or strain. The handle of the lock serves also as a handle to raise and lower the end board. Both ends of the tub are alike.

Can be fitted with trucks to operate on double oval track when so specified. Weight of carrier and tub, 205 lbs.



No. 970 Star Poultry House Litter Carrier

NO. 970 Star Poultry House Litter Carrier has a tub that is 72 inches long, 26 inches wide and 14 inches deep. A capacity of approximately 12 bushels.

The tub is raised or lowered to any desired height by an endless chain operating over the drive wheel that is pinned to the end of the shaft and the shaft runs on roller bearings at all four points of support.

The tub may be lowered to the level of the dropping boards and a hoe or scraper used to clean the dropping boards directly into the tub.

The Star Poultry House Litter Carrier is also invaluable when the floor is being cleaned and the litter being removed. It may also be used to convey sand, fresh litter and feed into the building.

The tub can be unhooked from the

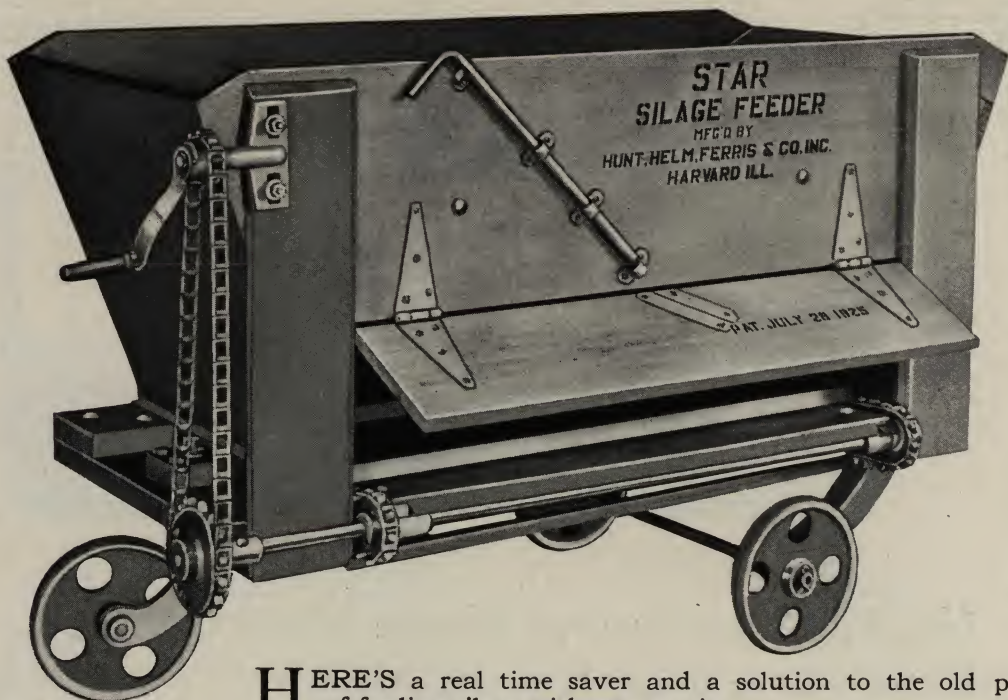
conveyor whenever desired to provide for platform hauling boxes or egg cases for convenience in gathering eggs.

Weight, conveyor only, 85 lbs., weight, tub and bail, 150 lbs.

Carrier, complete with tub and bail, weight, 235 lbs.



No. 1258 Star Side Delivery Silage Truck

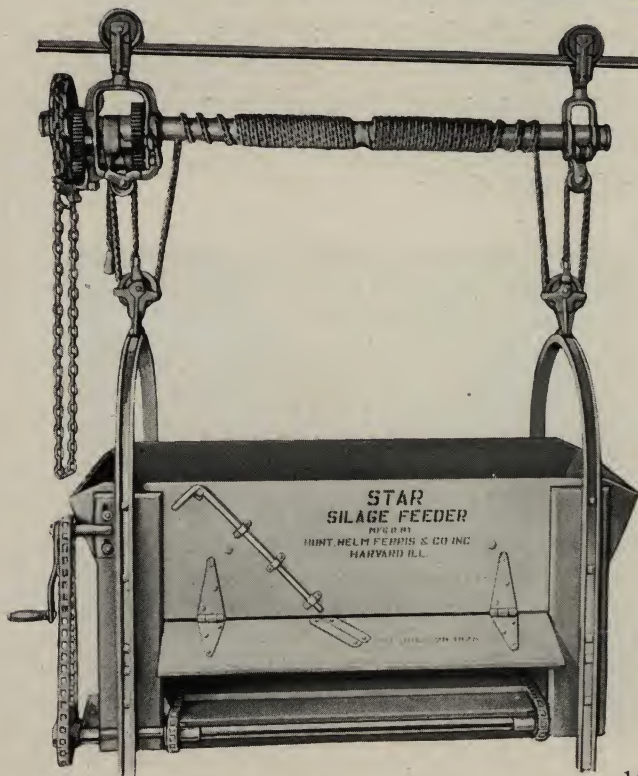


HERE'S a real time saver and a solution to the old problem of feeding silage without scooping.

Turn the crank as you go and the long 1-inch by 1-inch conveyor bars scrape a layer of silage off the flat bottom of the tub and out into the manger. The bottom door locks shut while tub is being filled. It opens when the heavy cane bolt that holds it is pulled up.

Heavy wood tub with galvanized bottom holds sixteen bushels.

No. 1258 Star Side Delivery Silage Truck is finished in gray enamel and weighs 220 lbs.

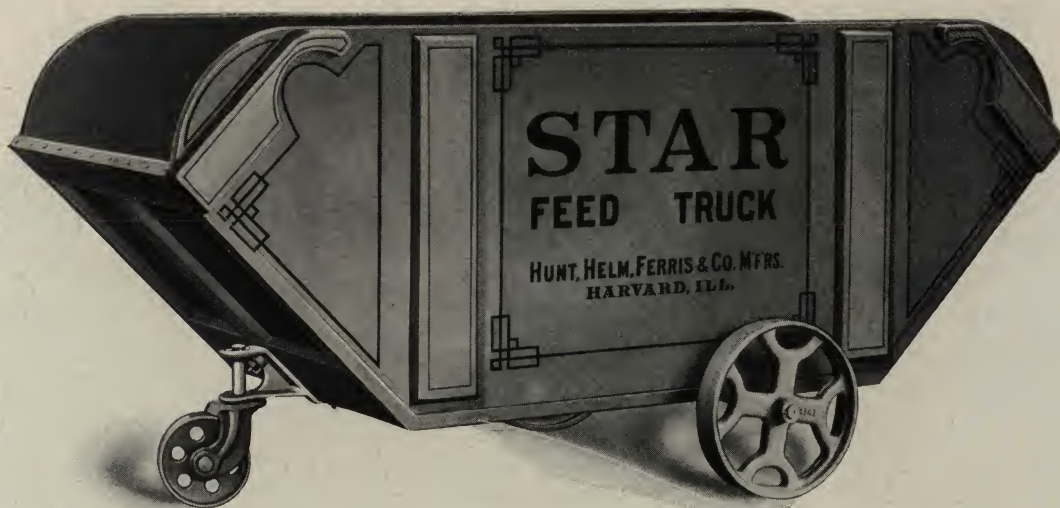


No. 1257 Star Silage Conveyor

This is the same as the truck illustrated and described except that the floor wheels are omitted and are replaced by two heavy channel steel bales and a heavy duty conveyor which operates on Star Double Angle Steel Track.

Finished in gray enamel.

Weight, 240 lbs.



Reproduced from Actual Photograph of the

No. 443 Star Feed Truck

THE STAR Floor Feed Truck is a necessity in every barn where an overhead feed carrier is not used. It is lower in cost than a suspended carrier since track hangers and switches are not required. It can be operated to any place in the barn, run directly under the feed or silo chutes—can be used not only for carrying feed, but also bedding, baled shavings or any other material to be delivered to any part of the barn. It is easily operated over a concrete or wood floor and can be turned in its own length.

SPECIFICATIONS

TUB bottom of one piece, heavy galvanized steel securely fastened to the sides of selected wood, well seasoned, kiln-dried, clear and free from knots, sap and check. Reinforced at sides, bottom and ends with galvanized steel corner plates. Truck is fitted with hand-holds at ends.

MAIN WHEELS Gray iron, 12 inches in diameter; 2 inch face; machined bearings turning on cold rolled axle, 1 inch in diameter.

FRONT SWIVEL WHEEL Gray iron, 6 inches in diameter; 1½ inch face, with cold rolled steel

shaft; swiveled to permit truck to be turned in its own length. All wheels spaced for easy moving of heavy loads.

FINISH Wheels and iron work gray enamel, baked on. Wood work given prime coat of lead and oil after which it is given a final brush coat of special varnish-enamel. Color, gray.

SIZES AND WEIGHTS Regular size (for feed alleys, 36 inches wide or wider) 68 inches long, 26 inches wide, 24 inches deep. Capacity, 16 bushels. Weight, 190 lbs.

Larger size (for feed alleys 40 inches wide or wider), 71 inches long, 30 inches wide, 30 inches deep. Capacity, 25 bushels. Weight, 225 lbs.

No. 444 Star Lock Joint Double Angle Track



Fig. 582 Lock Joint Splice

STAR Conveyor Track is built of two pieces of one-inch carbon steel angles. The angles are securely riveted together, each rivet passing through a malleable spool which keeps the angles a uniform distance apart.

The space between the angles forms a continuous slot so that the hangers may be used at any desired distance apart. With hangers spaced 12 inches apart, this track has been successfully used to carry loads averaging 1,000 pounds to the foot.

Nowhere is the advantage of the STAR Double Angle track more apparent than in the method of connecting the joints.

As the illustration shows, the track is held between the two heavy malleable parts of the splice by three heavy $\frac{7}{16}$ -inch bolts. When these bolts are drawn up it levels the track joint and holds it level. It makes the track just as strong and smooth at the joint as anywhere else.

The two heavy lugs on the underside of the top piece fit into notches in the top of the track slot. They line the track up squarely and prevent joint separation—a distinctive feature and an important item in the smooth, even operation of carriers.

STAR Double Angle Track is finished in japan. Weight per foot, 2 lbs. Furnished in 6 and 10-ft. lengths.

No. 414 One-Piece Lag Screw Hangers

Keep the Track Firm and Level

NO track can carry more than the hangers which support it. The Lag Screw Hanger being in the center of the track, the weight is directly below. The advantage thus gained will be apparent if you raise a weight with your arm hanging straight down and then attempt to raise the same weight while holding the arm out at an angle.

Track Is Easiest To Install

When installing STAR Conveyor Track, line up the hangers with a chalk line, screw them into the joists after removing the nuts and washers. You don't have to bother with the track at all until the hangers are in place. Slip the track over the hangers, put on the washers and nuts, draw the nuts up tight and the track will be firmly held in a vise-like grip between the shoulder on the hanger and the nut and washer on the end of it.

Rigid Hangers Help Carriers Run Smooth

The hanger being made in one piece, there is no tendency on the part of the track to swing or wobble. This is the secret of the ease with which STAR Conveyors operate on this style of track.

Track Can Be Leveled Up—Any Time

With a wrench on the square shoulder of the hanger you can screw the hanger in or out as desired, and make the track perfectly level.

The hangers are usually 12 inches apart but the continuous slot in the track permits their being spaced to suit the arrangement of joists. When determining the number of hangers allow four to six for each curve.

Fig. 414 Lag Screw Hanger is 7-16 inches in diameter. It is threaded $3\frac{1}{2}$ inches and made in several lengths.

The $10\frac{1}{4}$ -inch hanger allows the track to hang approximately 6 inches below the joists or wood supports. Specify this size where timbers are used to support the track outside or where there are no beams to clear inside the building.

Where it is necessary for the track to clear a beam supporting the joists, longer hangers are required. Stock sizes of hangers are as follows:

Length	Weight per doz.
10 $\frac{1}{4}$ -in. Lag Screw Hangers	5 lbs.
15 $\frac{1}{4}$ -in. Lag Screw Hangers	7 $\frac{1}{2}$ lbs. Clear 6-in. Beams
17 $\frac{1}{4}$ -in. Lag Screw Hangers	9 lbs. Clear 8-in. Beams
19 $\frac{1}{4}$ -in. Lag Screw Hangers	10 lbs. Clear 10-in. Beams
21 $\frac{1}{4}$ -in. Lag Screw Hangers	11 lbs. Clear 12-in. Beams

Where hangers longer than the above are required, give distance from bottom of track to bottom of joists and proper length will be supplied.

Fig. 414
(Actual Size)

No. 1176 Star Turntable and Cross-over Switch

WHERE two tracks cross at the same level the Star Turntable and Cross-over Switch provides a perfect way to run the carrier along either track and across the other.

It consists of a heavy ring supporting the revolving disc or table from which is suspended a six-inch section of track. This is turned to right or left and brought into line with the stationary track by a pull on one of the chains shown in the illustration. A spring bolt automatically locks the disc and firmly holds the track in position.

The simplicity of construction makes it trouble-proof and it is easily installed by simply fastening the four heavy bolts to the four ends of track which converge at the switch.

It can be used as a turntable to switch a carrier from one track to the other. It can also be used instead of a curve where lack of room does not permit the use of a regular curve.

Furnished in black to match track. Weight, 20 lbs.

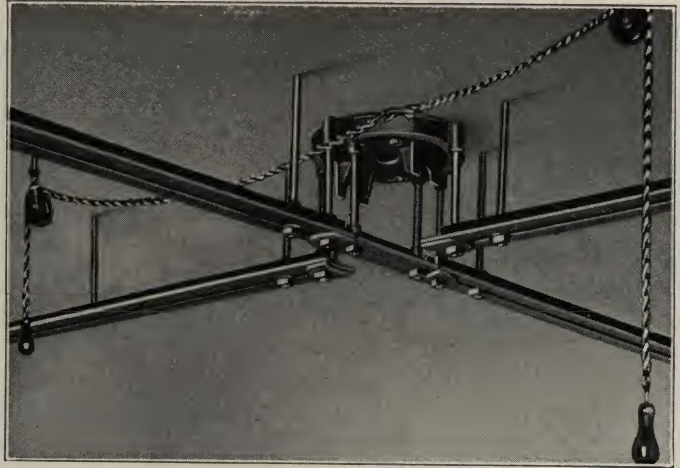


Fig. 1176



Fig. 346

Removable Section of Track

THIS short section is fitted with safety locks which automatically drop down to prevent the carrier from running off the track when the section is taken out.

Reinforced removable sections for swinging doors should be at least six inches longer than the width of the door to allow plenty of clearance.

No. 346 Star Removable Sections for Sliding Doors, regular length 18 inches, weight 6 lbs.

Star Reinforced Removable Sections up to 5 feet 6 inches, weight 7½ lbs. per foot.



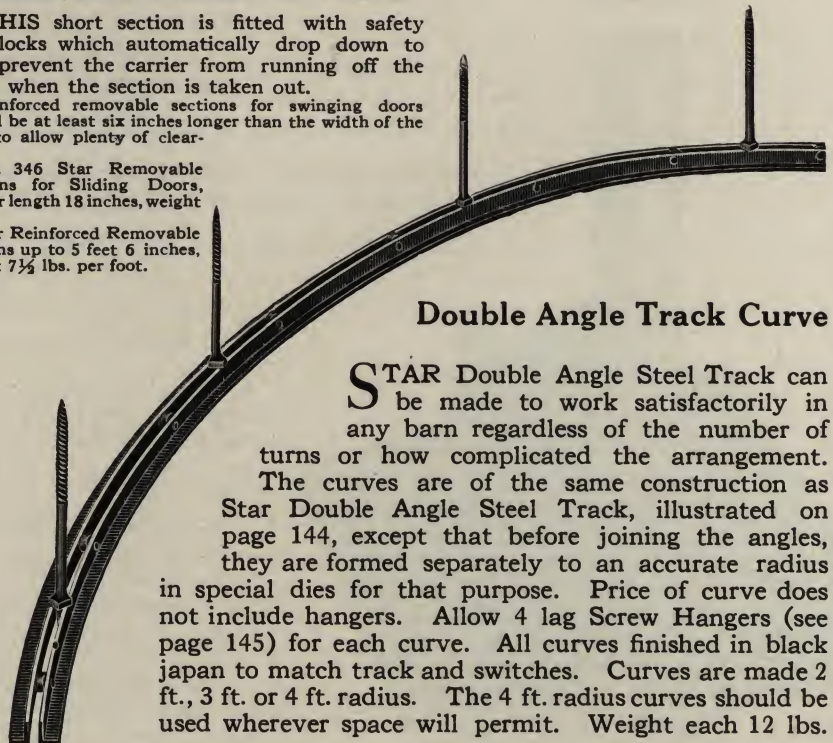
Fig. 361

Wall Bracket for Wood Ridge Pole

WHERE Wood Ridge Pole is used outside of the barn to support the track, this can be attached to the barn by wall bracket, Fig. 361.

This wall bracket of malleable iron is made to give the necessary support to the end of the Wood Ridge Pole and to provide clearance for the door rail and sliding doors.

Wall Bracket, Fig. 361, for Wood Ridge Pole, weight, 6 lbs.



Double Angle Track Curve

STAR Double Angle Steel Track can be made to work satisfactorily in any barn regardless of the number of turns or how complicated the arrangement.

The curves are of the same construction as Star Double Angle Steel Track, illustrated on page 144, except that before joining the angles, they are formed separately to an accurate radius in special dies for that purpose. Price of curve does not include hangers. Allow 4 lag Screw Hangers (see page 145) for each curve. All curves finished in black japan to match track and switches. Curves are made 2 ft., 3 ft. or 4 ft. radius. The 4 ft. radius curves should be used wherever space will permit. Weight each 12 lbs.

Star Two-way and Three-way Switches

For Use in Connection with Star Conveyor Track

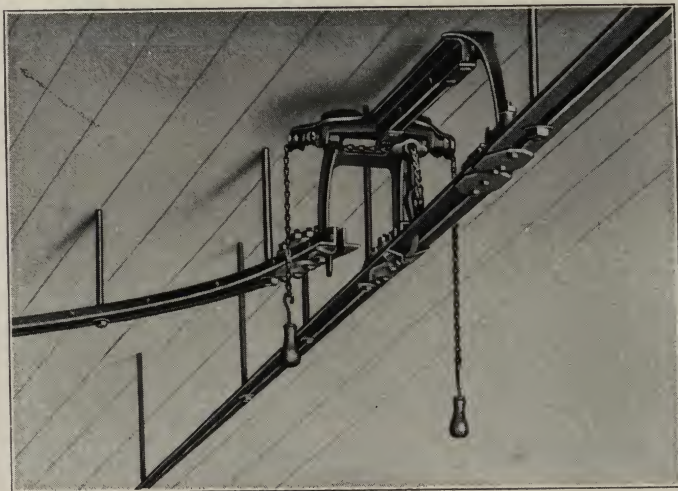


Fig. 337

OPERATION—A simple downward pull on either hand chain will cause the hinged section to travel either to right or left, register and lock automatically in perfect alignment, and just the instant that the hinged section is released from its position the safety lock drops down and guards the open end of either straight track or curve—no watchman could be as faithful or efficient.

Specify Two-way Switch when branching off either to right or left of main track. Allow 29 inches between the two ends of the main track, then bolt the switch in place.

Specify Three-way Switch when branching off to both right and left of main track. Allow $27\frac{1}{4}$ inches between the two ends of the main track, then bolt switch in place.

Two-way Switch, weight each, 26 pounds.

Three-way Switch, weight each, 29 pounds.

Finish—Black japan.

When ordering curves for use with switches, specify whether for Two-way or Three-way Switches. Curves illustrated and described on this page.

CONSTRUCTION

THE STAR Overhead Switches, illustrated on this page, have been perfected to a point far in advance of anything similar offered, regardless of price.

We can offer you no better argument for installing a STAR Overhead system of track for any purpose than the perfected switches which we have been furnishing a number of years. These switches are an assurance against all switch annoyances—they are simple, strong and efficient—nothing to get out of order, nothing to break, and what's more, the carrier cannot run off when the switch is open. The automatic safety locks take care of that.

STAR Switches are constructed entirely of the best malleable iron, except the hinged section and the backbone, which are of the same strong construction as the track itself. They are rigidly attached to the track and curve ends by malleable splices. The backbone and malleable legs on the frame are joined as rigidly as though they were cast in one piece, yet this backbone is adjustable in order that the switch itself can be lined up with the track and curves which it connects.

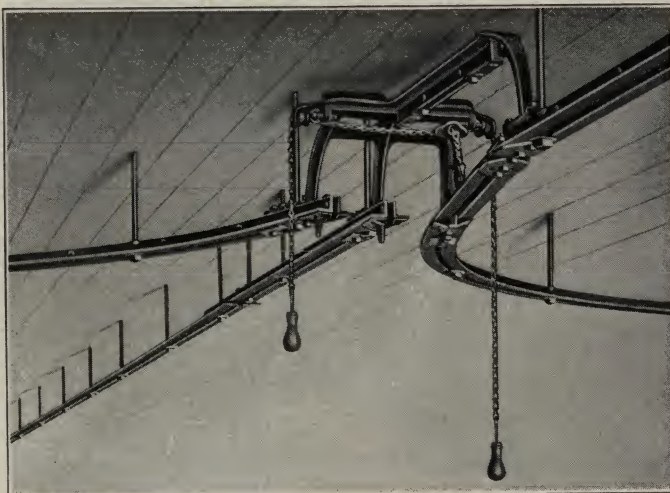
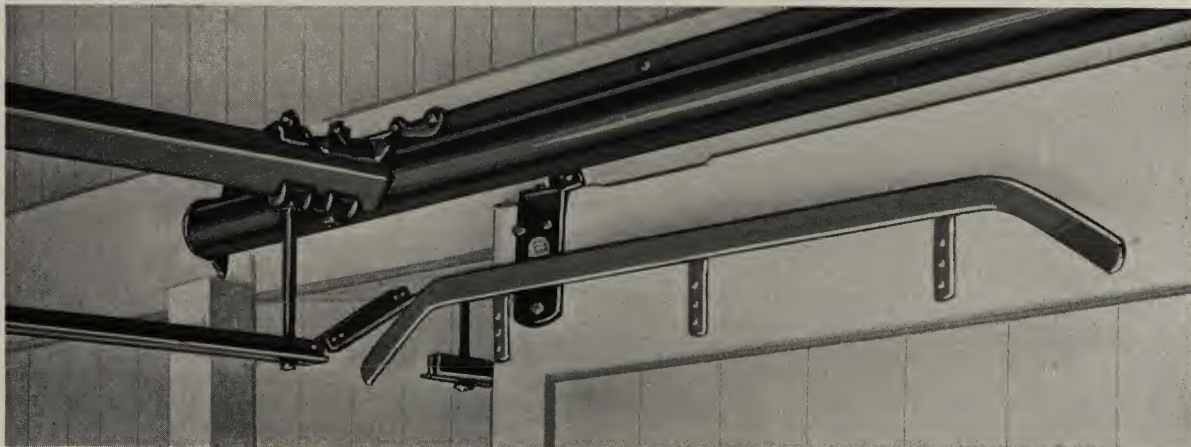


Fig. 319



No. 1256 Hinged Section of Track and Automatic Opener



A HINGED section of track is provided to permit the operation of a sliding door.

The raising and lowering of this hinged section is automatically taken care of by a track opener. This track lifter is shaped as shown in the illustration and fastened to the door by heavy brackets.

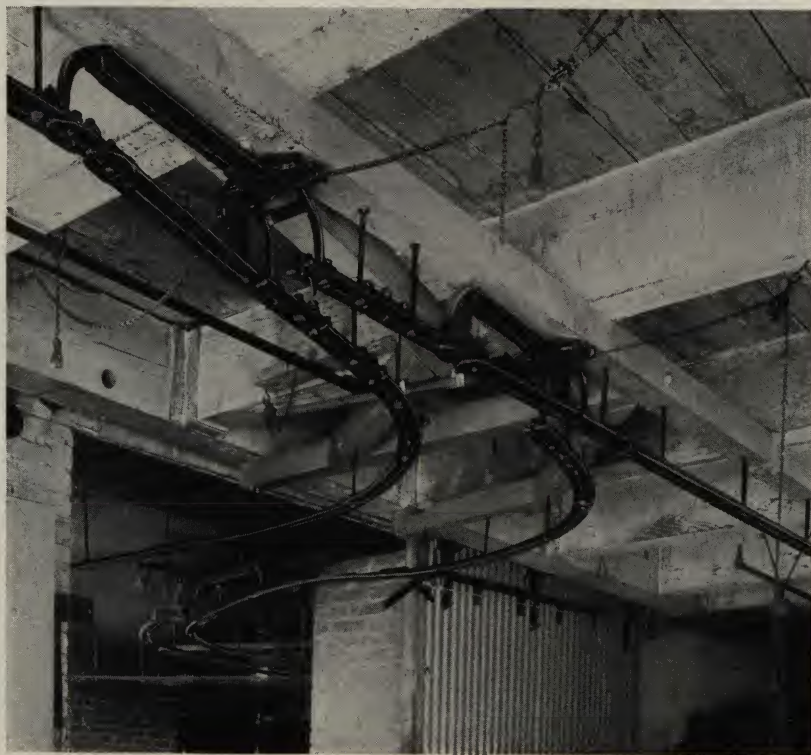
When the door is closed the slanted end of the steel bar engages the underside of the hinged section, raising it gradually as the door moves along and holding it up out of the way.

When the door is opened the hinged section drops down into position so that travel can be resumed.

This automatic method of opening the track for the operation of sliding doors is a great time saver.

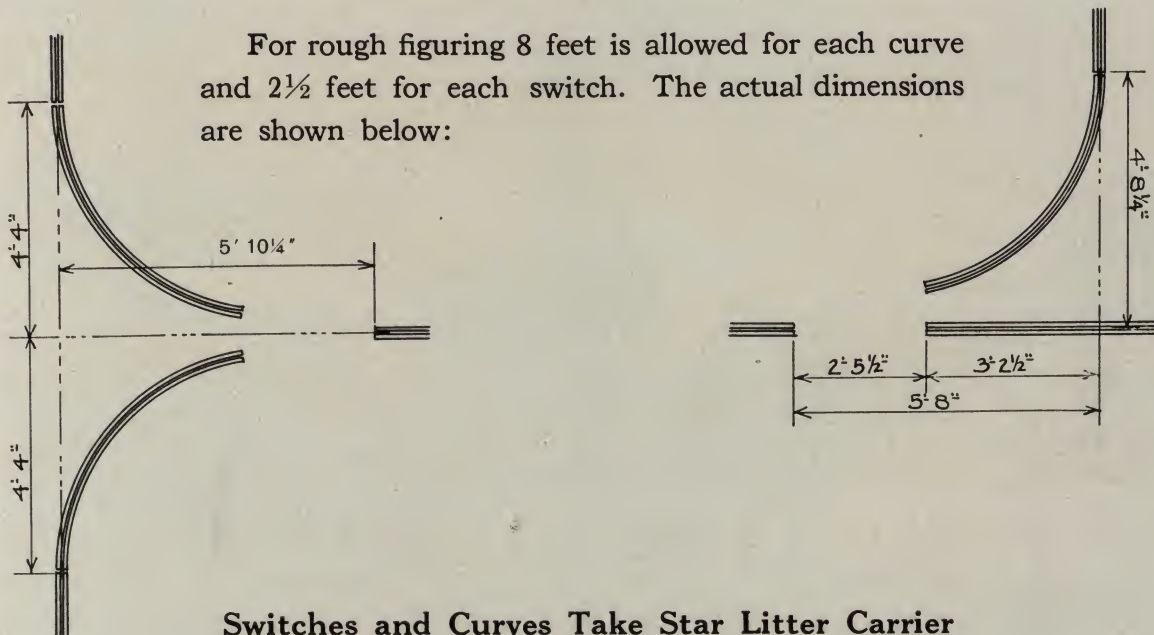
The lower illustration

shows the track opener and hinged section of track used in connection with a rather unusual and intricate arrangement of track switches and curves.



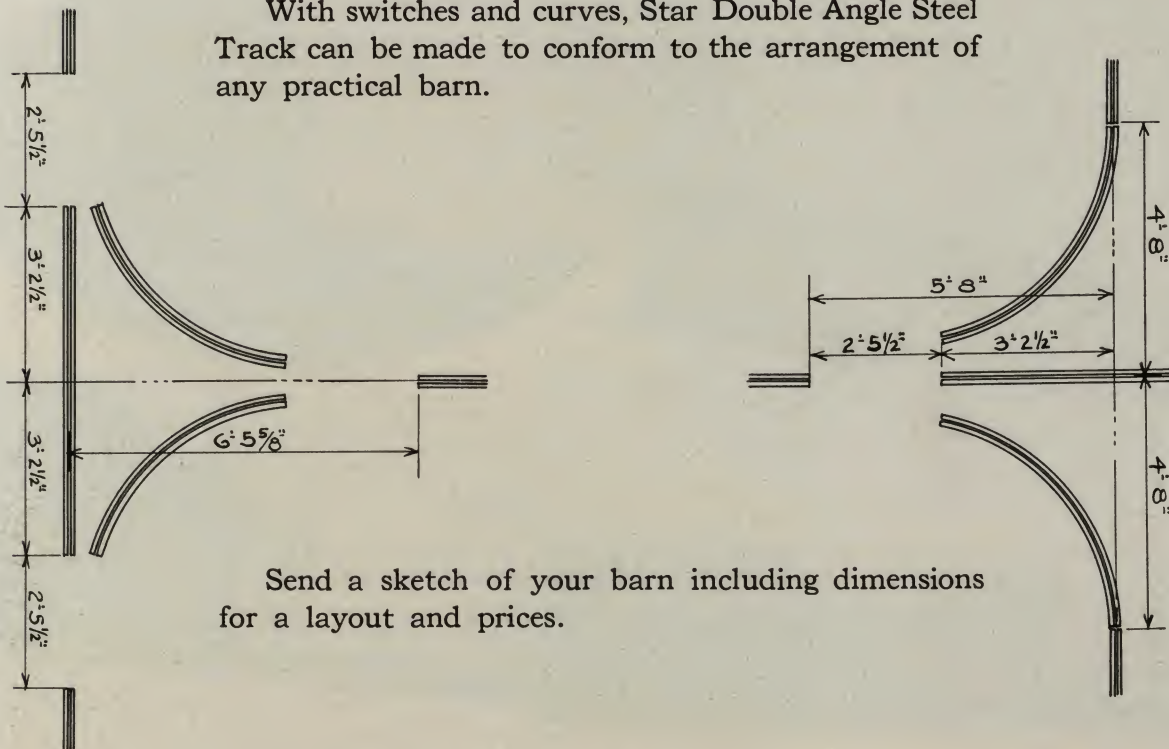
Space Required by Switches and Curves

For rough figuring 8 feet is allowed for each curve and $2\frac{1}{2}$ feet for each switch. The actual dimensions are shown below:



Switches and Curves Take Star Litter Carrier Track Anywhere

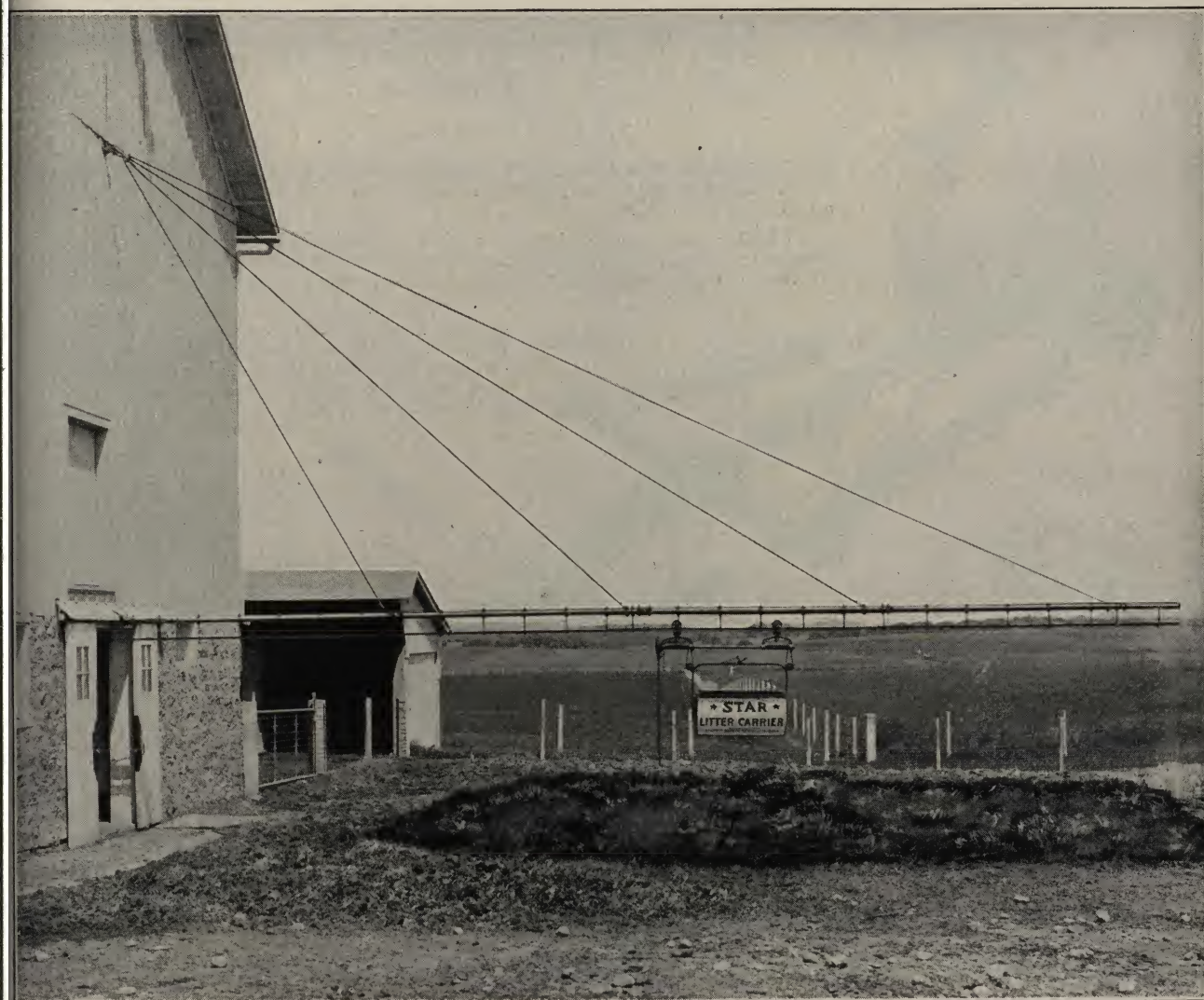
With switches and curves, Star Double Angle Steel Track can be made to conform to the arrangement of any practical barn.



Send a sketch of your barn including dimensions for a layout and prices.



Reproduced from Photographs of Star Swinging Booms in Actual Use



The Star Swinging Boom

THE STAR Swinging Boom represents the most satisfactory method of supporting track outside of the barn. It leaves the yard entirely clear, there being no supporting posts to interfere with the use of the yard or to cause injuries to cattle or horses; no timbers to rot out or break.

The STAR Swinging Boom makes possible a dumping area eight or ten times greater than with a post supported track.

When not in use, the boom may be swung around against the barn. This feature is especially desirable where the hay is taken in at the end of the barn, as the boom is not in the way.

The track inside of the barn and that suspended

from the boom is connected by the Sliding Removable Section shown in Figure 438 on the following page.

The length of the boom depends upon the height of the barn. The distance from boom to the clevis, from which the guy rods are suspended, should be at least 3 to 5 feet greater than one-third of the total length.

If a 30-foot boom is desired, the guy rods should be attached 13 to 15 feet or more above the boom itself.

The boom is attached to the barn by means of our patented hinge shown in Fig. 438, which straddles the door rail. Pivoted in this hinge is the boom itself of suitable length and supported by guy rods secured to the barn by clevis and plate directly above boom hinge.

No. 438 Star Swinging Boom

(Continued)

SPECIFICATIONS

MALLEABLE BOOM HINGE—straddles door rail, a $\frac{7}{8} \times 5\frac{1}{2}$ -inch pin forms the pivot and connects the part of the hinge secured to the boom with the part attached to the barn.

BOOM—constructed of heavy 2 x 2-inch galvanized high carbon steel angles, from which track is suspended by malleable clamps and track hangers. This construction is much stronger and more lasting than booms of ordinary gas pipe.

BOOM HANGERS—of suitable length to suspend the track approximately 6 inches below the boom. If for any reason it is necessary to place the boom hinge above the door rail, longer hangers are necessary. When ordering longer boom hangers, specify the number of inches "longer than regular."

SLIDING REMOVABLE SECTION—This patented feature is one of the strongest arguments in favor of a STAR Boom. It is built of malleable iron.

This section telescopes as the boom turns around in a half circle. It allows the carrier to leave the barn even when the

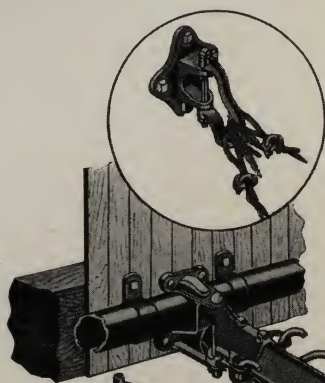


Fig. 438

boom is standing at an angle, without friction or binding.

The sliding section may be removed from the pivots at one end or at both when the sliding doors are to be closed. If double sliding doors are used, these doors may be notched to fit closely around the sliding removable section so that it is never necessary to remove it.

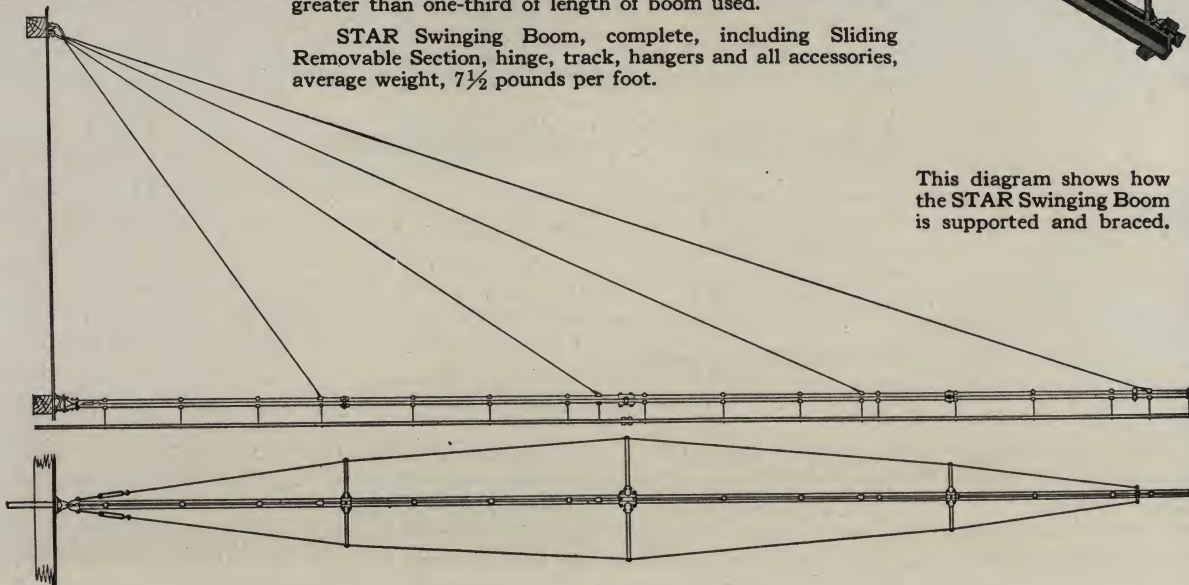
STAR DOUBLE ANGLE STEEL TRACK—See page 101.

LENGTHS—Booms are furnished regularly in the following lengths: 15 ft., 20 ft., 30 ft., 35 ft. and 40 ft.

Furnished complete with track hangers, guy rods, truss rods, side arms, etc. The side arms and truss rods are not necessary with the 15-ft. and 20-ft. lengths.

When ordering, specify distance from the point where hinge of boom will rest, to the point where the guy rods fasten to the barn. This distance must be at least five feet greater than one-third of length of boom used.

STAR Swinging Boom, complete, including Sliding Removable Section, hinge, track, hangers and all accessories, average weight, $7\frac{1}{2}$ pounds per foot.



This diagram shows how the STAR Swinging Boom is supported and braced.

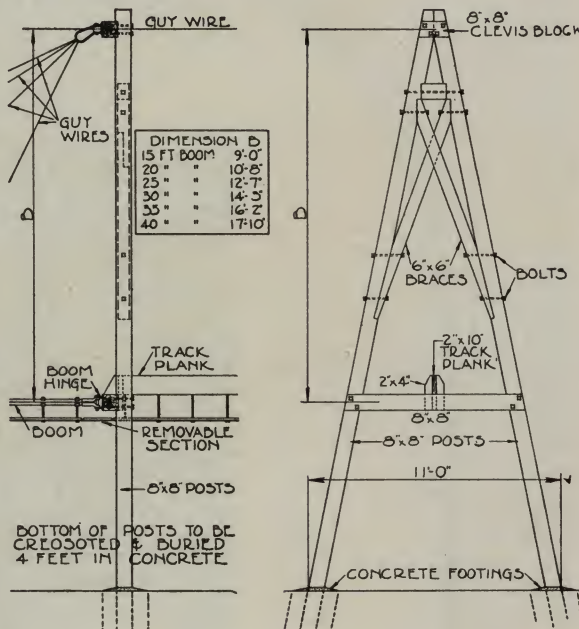
Construction of "A" Frame to Support Star Swinging Boom

AN "A" frame constructed of 8x8 timbers as shown at the right is easily built to support a swinging track. The clevis for the boom guy-wires is attached at the top of the "A" frame. Guy-wires also run back from this point to a suitable secure anchorage on the building.

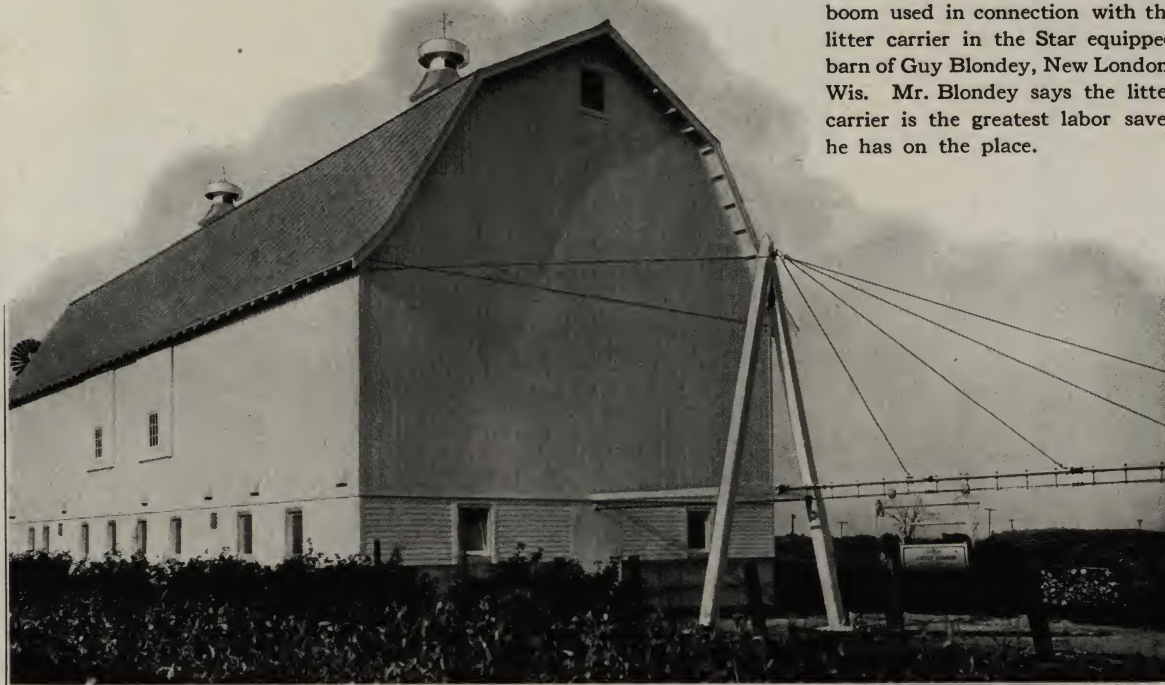
This "A" frame placed 12 feet or 14 feet away from the building permits the use of a detachable section of track, which with the plank that supports it can be lifted out when it is necessary to drive through.

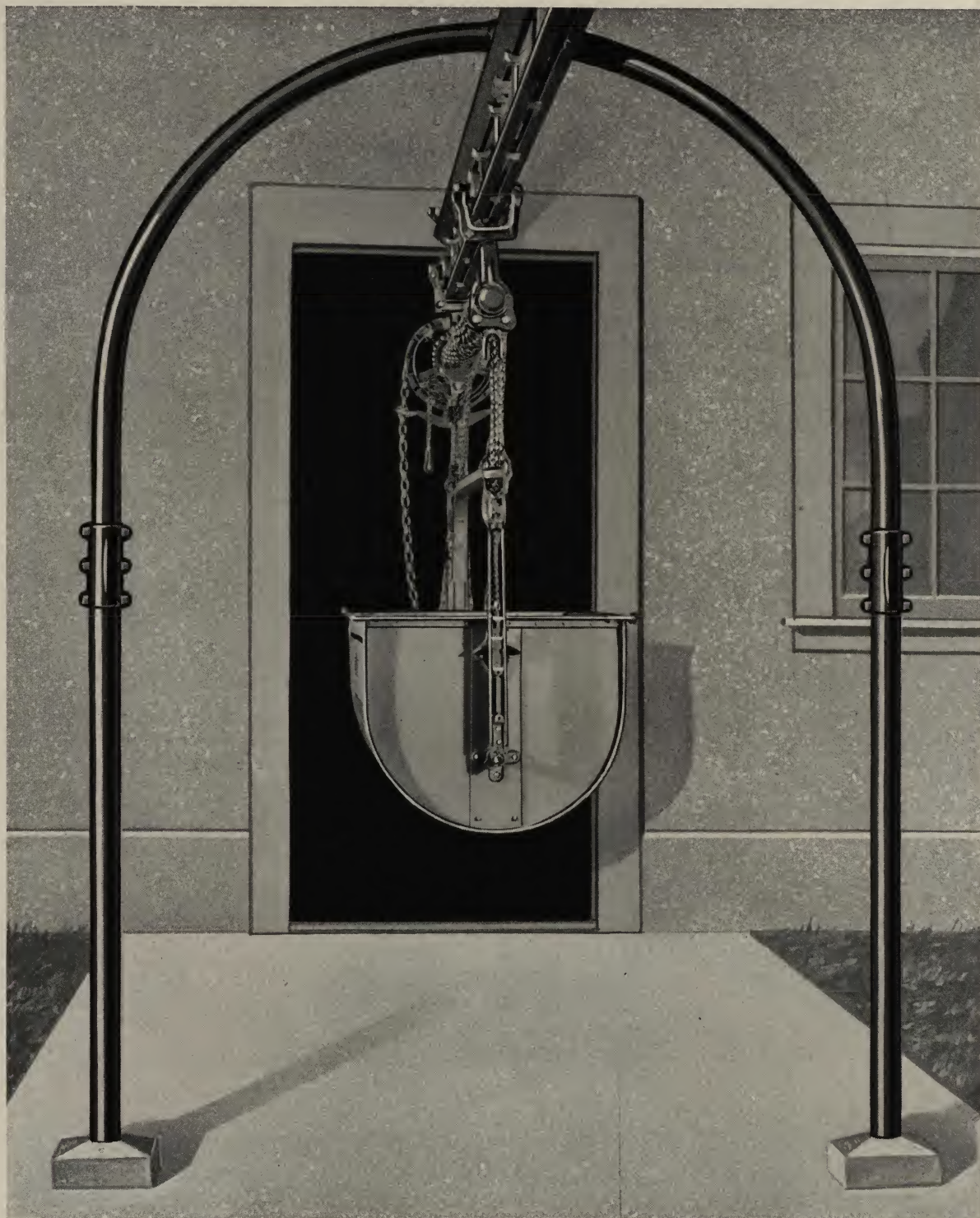
Another place where the "A" frame makes it possible to enjoy the advantages of a swinging boom is where a projecting shed roof, or "over-chute" as it is often called would otherwise interfere with the installation of the boom. The "A" frame is placed at the outer edge of the over-chute or projecting roof and anchored as shown.

The "A" frame often solves the problem of using a boom with a track along the outside of a building which connects several tracks which run at right angles to it inside the barn.



"A" frame supports the swinging boom used in connection with the litter carrier in the Star equipped barn of Guy Blondey, New London, Wis. Mr. Blondey says the litter carrier is the greatest labor saver he has on the place.

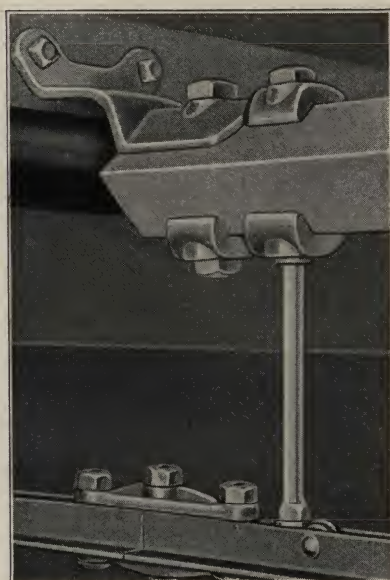




No. 901 Outside Track Supports

Made of 2 $\frac{3}{8}$ -inch O. D. Pipe

The top is bent into a semicircle with a 5 foot diameter. Each end of the semicircle is connected with the top of the vertical pipe by a long, heavy malleable sleeve-clamp firmly held by 6 bolts. Arch supports should be placed 8 feet apart and securely set in concrete. Specify height over all, complete.



No. 867 Boom Bracket Connecting All-steel Track Support With Building.

Support for Star Double Angle Steel Track Outside of Building

THE above illustration shows our unique All-steel support for STAR Double Angle Steel Track in the yard.

It is made of two 2-inch high carbon galvanized steel angles rigidly joined by hanger supporting clamps. This construction is very strong and durable as well as neat in appearance.

STAR Steel Columns, as described and shown on the following page, are used to support this steel construction. These columns should be placed eight feet apart and securely set in concrete.

STAR Steel Support for Double Angle Steel Track complete, including track, hangers and attachments—everything except supporting columns and brackets shown on next page, average weight per foot, 6 pounds.



Star Steel Columns and Brackets

For Supporting STAR Double Angle Steel Track

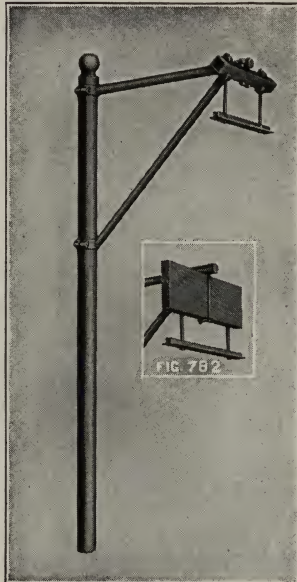


Fig. 781

IN FIGURE 781 we illustrate a Steel Column 4 inches in diameter, with triangular bracket from which the Steel Support illustrated and described on the preceding page or Wood Ridge Pole, Fig. 782, can be neatly and permanently suspended.

In figuring the height of the columns, allow at least two feet for an anchorage below ground level. Each column should be firmly set in concrete abutment.

The triangular bracket allows for the proper clearance of the carrier. This bracket is made of $1\frac{1}{8}$ -inch O. D. pipe and attached to the upright column by malleable clamps.

Steel Columns—Diameter, 4 inches; height to order; weight, per foot, 5 pounds.

Ornamental Ball for Steel Column, weight, each, 6 pounds.

Triangular bracket, complete as illustrated, weight, each, 20 pounds.

When ordering, specify whether for Steel Support or Wood Ridge Pole.

Finish: Gray enamel.

Fig. 783 shows a special horizontal bracket for carrying the Steel Support illustrated on the previous page when installed along side of building. This does away with posts or other obstructions and leaves the space along side of building entirely clear. A malleable split flange is used to attach bracket to the side of building.

Horizontal Bracket for Steel support complete as illustrated, weight each, 12 pounds.

Finish: Gray enamel.

Fig. 784 illustrates a simple and economical method of suspending the Wood Ridge Pole supporting Double Angle Steel Track along side of building. The track should be attached to 2 x 8 or 2 x 10 timbers which can be held away from the building a distance of 4 feet 6 inches by wood pieces spaced 6 to 8 feet apart. Strap irons attached by Lag Screws support the entire wood construction. This illustration offers a practical solution of the problem of installing Double Angle Steel Track suspended from Wood Ridge Pole along side of building.

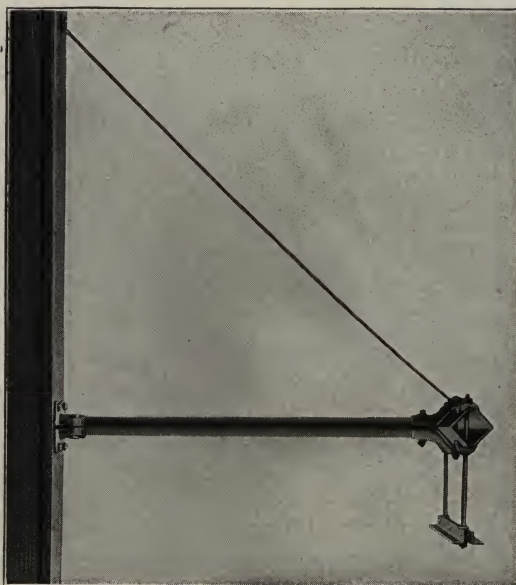


Fig. 783

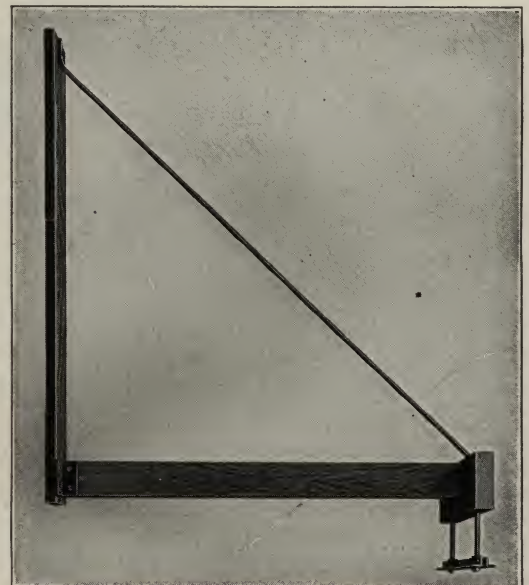
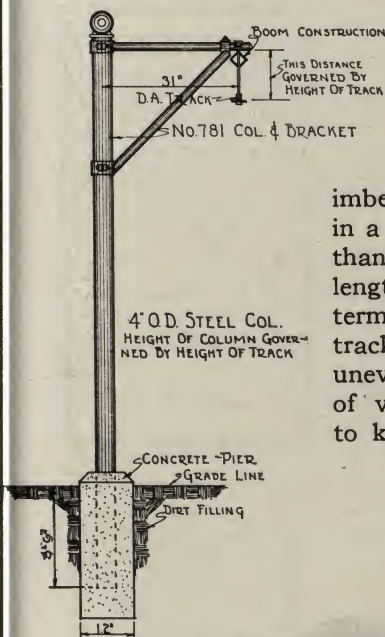
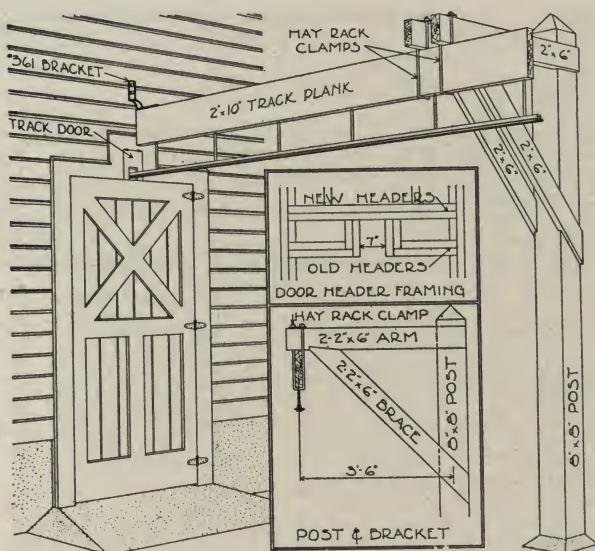


Fig. 784



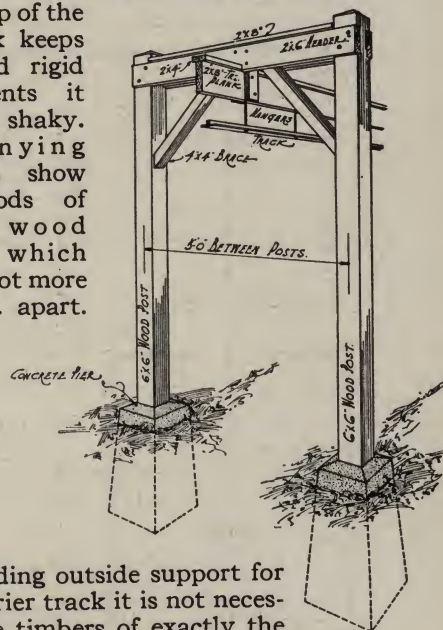
Steel Columns

The 4-inch steel columns as shown in the accompanying illustration should be imbedded at least 3 ft. 6 in. in a pier of concrete not less than 12 inches square. The length of the posts are determined by the height of the track. Where the ground is uneven it is best to use posts of various lengths in order to keep the track level.

Track Supports for Star Double Angle Steel Track

Wood Supports

STAR double angle steel track can be fastened to a 2 x 10 track plank or ridge pole with 10½ inch lag screw hangers spaced 2 ft. apart. A 2 x 4 nailed along the top of the track plank keeps it firm and rigid and prevents it from being shaky. Accompanying illustrations show two methods of building wood supports which should be not more than 12 ft. apart.

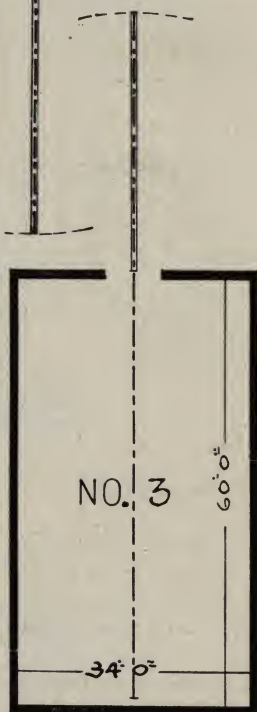
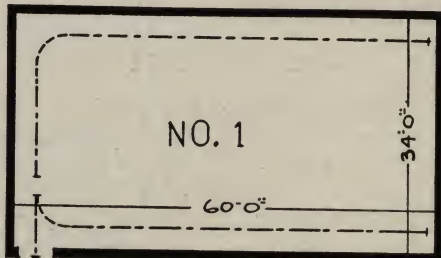


In providing outside support for a litter carrier track it is not necessary to use timbers of exactly the size specified above. There is no objection to having them larger or stronger if they can be economically provided.

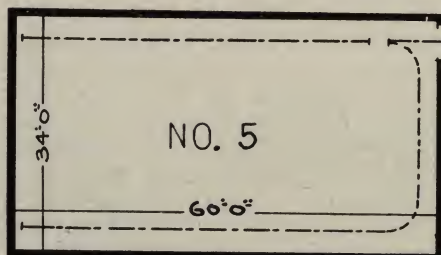
Below is shown a very satisfactory installation of litter carrier track supported by rough posts outside the Star equipped barn of Dr. Bayless near Simpsonville, Kentucky.



Material Required For Star Rigid Track Carriers



Stationary track of any length can be used in any of the cases where the Star swinging boom is shown. Be sure to include 10 1/4 in. hanger for every 2 feet of outside track.



All barns shown are 34 ft. x 60 ft. inside. Larger or smaller barns increase only the amount of track and number of hangers needed as indicated at the end of each example.

No. 1

- 1 333 Star Litter Carrier No. 6 tub.
- 132 ft. 444 Double Angle Track.
- 2 363 Stop Blocks.
- 76 414 1 7/8 in. Lag Screw Hangers.
- 1 356 Double Angle Curve.
- 1 367 Double Angle Curve for use with switch.
- 1 337 Two-Way Switch.
- 1 35 ft. Long Swinging Boom Complete.

Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.

No. 3

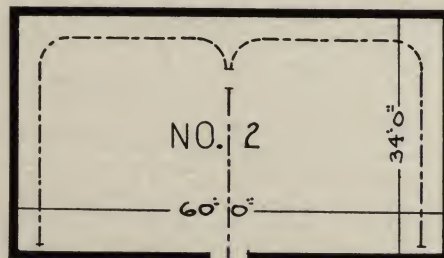
- 1 333 Star Litter Carrier No. 6 tub.
- 60 ft. 444 Double Angle Track.
- 1 363 Stop Block.
- 31 414 1 7/8 in. Lag Screw Hangers.
- 1 35 ft. Long Swinging Boom Complete.

Add 2 feet of track and 1 hanger for each 2 feet that the barn is longer than 60 feet. Deduct the same for a shorter barn.

No. 5

- 1 333 Star Litter Carrier No. 6 tub.
- 132 ft. 444 Double Angle Track.
- 2 363 Stop Blocks.
- 76 444 1 7/8 in. Lag Screw Hangers.
- 1 356 Double Angle Curve.
- 1 367 Double Angle Curve for use with switch.
- 1 337 Two-Way Switch.
- 1 35 ft. Long Swinging Boom Complete.

Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.



No. 2

- 1 333 Star Litter Carrier No. 6 tub.
- 108 ft. 444 Double Angle Track.
- 2 363 Stop Blocks.
- 72 414 1 7/8 in. Lag Screw Hangers.
- 2 356 Double Angle Curves.
- 2 367 Double Angle Curves for use with Switch.
- 1 337 Two-Way Switch.
- 1 35 ft. Long Swinging Boom Complete.

Add 6 feet of track and three hangers for each additional 2 feet that the barn is wider than 34 feet. Deduct the same for narrower barn.

No. 4

- 1 333 Star Litter Carrier No. 6 tub.
- 120 ft. 444 Double Angle Track.
- 3 363 Stop Blocks.
- 70 414 1 7/8 in. Lag Screw Hangers.
- 1 356 Double Angle Curve.
- 1 367 Double Angle Curve for use with switch.
- 1 337 Two-Way Switch.
- 1 867 Boom Bracket.
- 1 346 Removable Section.
- 40 ft. Boom Angle, Track and Hangers.
- 4 781 Boom Supporting Arms and Braces.
- 4 in. O. D. by 12 ft. Long Posts.
- 4 in. Ornamental Ball Caps.

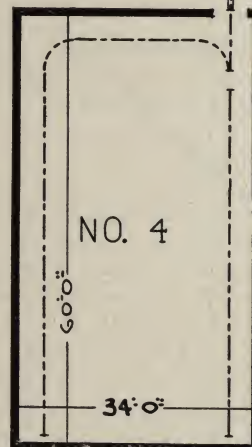
Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.

No. 6

- 1 333 Star Litter Carrier No. 6 tub.
- 108 ft. 444 Double Angle Track.
- 3 363 Stop Blocks.
- 73 444 1 7/8 in. Lag Screw Hangers.
- 2 356 Double Angle Curves.
- 2 367 Double Angle Curves for use with switch.
- 1 319 Three-Way Switch.
- 1 35 ft. Long Swinging Boom Complete.

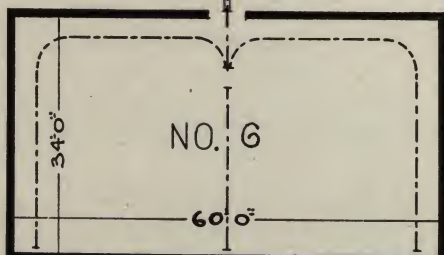
Longer or shorter booms may be used.

A 35 ft. Boom provides a dumping space equivalent to that of 200 ft. of stationary track.



(No. 6—Cont.)

Add 6 feet of track and three hangers for each additional 2 feet that the barn is wider than 34 feet. Deduct the same for narrower barn.



Star rigid track carrier can be installed in any barn. If your lay-out is different than any of the above send us a rough sketch of it, including dimensions, for complete figures and prices.

How to Order Carriers and Accessories for Star Double Angle Steel Track

Send a Rough Sketch With Your Order Showing Where Track is to Run.

CARRIER—Select the carrier and if for Litter, specify the size of tub—either No. 6 or No. 8.

TRACK—Take inside measurements first as though the track were to be installed with square turns. Add the number of feet required for out in the yard and then deduct 8 feet of track for each curve used without switch and 4 feet of track for each curve for use with switch. (If a Swinging Boom is desired, do not figure any track, hangers or accessories for use outside of barn, as everything necessary will be furnished with the boom.) Track is shipped in 6 and 12-foot sections.

SPLICES—Included free with track.

HANGERS—Fig. 414 Lag Screw Hangers are universally used. Figure one for every joist if 2 feet apart, one for every other joist if spaced 16 inches apart, four for each curve and four for each switch. Always figure 10 $\frac{1}{4}$ -inch hangers for track suspended from Wood Ridge Pole in the yard and for inside of barn if there are no beams to clear.

If carrier passes under the beams on which the joists rest, then measure the size of the beams and by referring to page 106 you can determine the length of hangers needed for use inside of the barn. Track should be installed level where possible.

To determine length of hangers for different heights of ceiling, first determine length of hangers needed for suspending track under the lowest ceiling, and the hangers required for the higher ceiling will be as much longer as one ceiling is higher than the other.

END STOP—Fig. 363. Specify one for each end of track to keep car from running off the track.

CURVES—Specify one regular 90-degree curve for each right angle turn where switch is not to be used. Specify one curve for use with two-way switch for each two-way switch used. Specify two curves for use with three-way switch for each three-way switch used.

SWITCHES—Specify two-way switch for each place where track branches off to either right or left of the main line. Specify three-

way switch for use where track branches off to both right and left of main line.

REMOVABLE SECTION—Specify one Removable Section for each sliding door through which track passes (see page 146), except when swinging boom is ordered, in which case the sliding removable section is furnished in connection with the boom. Also specify removable section for each place where two tracks intersect at right angles.

REINFORCED REMOVABLE SECTION—Specify one Reinforced Removable section for each swinging door out of which track extends, being sure to state length. Length should be at least 6 inches longer than width of door.

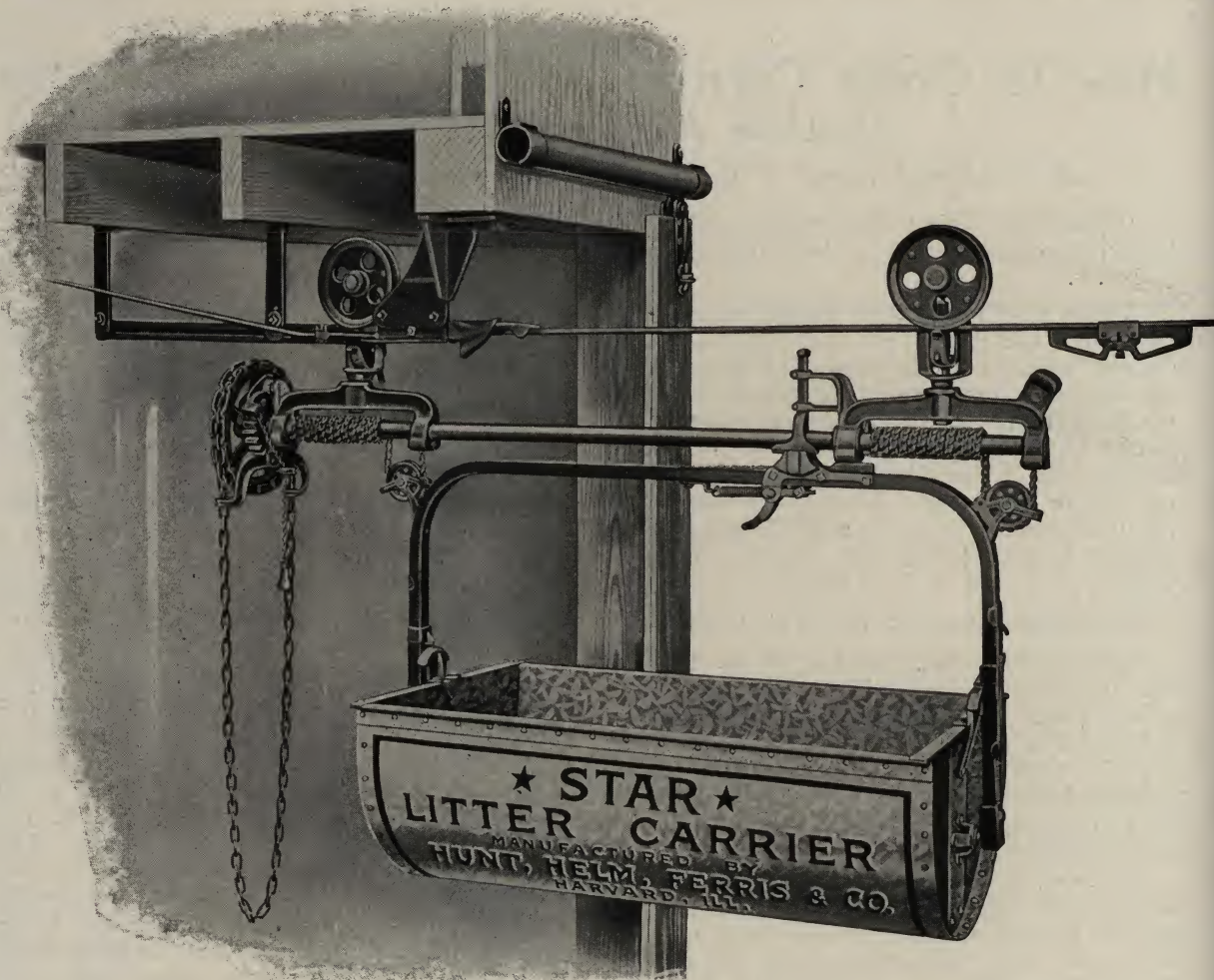
WALL BRACKET—Specify one to use in connecting Wood Ridge Pole to barn (see page 146).

SWINGING BOOM—If Swinging Boom is desired, specify length, 15, 20, 30, 35 or 40 feet, and the distance above hinge that the guy rods will be attached to the barn. The boom includes everything necessary for use outside of barn, also the sliding removable section (see page 152). If the boom hinge instead of straddling the door rail, which would be impossible with a single sliding door, is to be attached to the barn above the door rail, then specify length of boom hangers that will be required. Simply specify how many inches longer than regular these boom hangers are to be. Regular length boom hangers allow the track to hang 6 inches below the boom.

Swinging booms are also used frequently to suspend track over driveway, so that when swung out of the way, the driveway is clear. When ordering booms for driveways, specify the exact length and also specify one cast iron boom bracket to support the end of the boom opposite from the hinge to hold it in place.

DETACHABLE SECTION—If a section of wood support in the yard or across driveway is made removable to allow passageway for teams, specify a Detachable Section of track the same length as the wood ridge pole made removable. This detachable section is attached to and can be taken out with the section of wood ridge pole.

Double Angle Track CANNOT Be Used In Combination With Rod Track



Reproduced from Actual Photograph of

No. 592 Star Litter Carrier

Full Roller Bearing

A Combination for STAR Double Oval Steel Track Inside and Rod Track Outside
Can also be used on Rod Track both inside and outside

RECOMMENDED where the returning feature afforded by the Rod Track and the inside adaptability of the Steel Track is desired. The Double Oval Steel Track in the barn is always level so that there is no tendency for the carrier to move while being loaded. The carrier is given a push at the barn door and returns automatically. This carrier can be successfully installed in any barn no matter how complicated the arrangement, and regardless of the curves and switches required. The popularity of this type of Litter Carrier is accounted for by the fact that it combines so many desirable features of the steel track equipment with those of the rod track outfits.

The important connection between the STAR Double Oval Steel Track inside the barn and the Rod Track outside is made with the patented Giant Suspension Bracket which is used at the doorway. This bracket forms the connection between the two tracks. It allows a direct run from the STAR Double Oval Track to the Rod Track. This patented connection between the inside and outside track is a superior STAR feature which gives you the big advantage of being able to give the carrier a start while it is still inside the barn and depend upon it passing to the outside track with safety.

SPECIFICATIONS

STAR DOUBLE OVAL STEEL TRACK — described on page 164.

STAR DOUBLE OVAL STEEL TRACK HANGERS — described on page 164.

SWIVEL TRACKER WHEELS — 7 inches in diameter, have a lathe-turned tread. Each tracker wheel operates on 12 extra long, cold rolled steel bearings, surrounding a shouldered steel axle pin.

TRIPPING DEVICE — is so constructed that as soon as it hits the trip block the double latches automatically release the tub from the bail, allowing it to dump. See Fig. 599. This device locks and unlocks the tub at both ends in unison.

RETURNING BUMPER — Insures the return of the carrier to the barn after dumping.

TUB — is made of heavy galvanized steel. Measures 26 x 40 inches and is 14 inches deep. The ends are of one piece with flanges formed on the edges, to which the body sheet is riveted. The ends are reinforced with heavy galvanized plates; the top edges of the tub are reinforced with galvanized angle irons, both along the ends and sides; the corners are securely riveted, as is every joint in the construction of the tub. These tubs are indestructible; will not get out of shape; when dumped, are self-cleaning on account of the rounding bottom which permits of no corners in which litter can collect. The shape of the tub makes it possible to carry a large load. Capacity, 6 bushels.

SPRING KEEPERS — which are automatically thrown up into place as the carrier leaves the Double Oval Steel Track for the Rod Track. See Fig. 600. These keepers absolutely prevent the carrier from jumping the track, and also rigidly lock the wheels in line with the track and prevent their binding. As the carrier returns from the Rod Track to the Double Oval, these keepers are automatically thrown down to permit the operation of the carrier on the Steel Track, and to allow the tracker wheels to pass the track hangers. At the same time that the keepers are thrown down, the swivel trucks are unlocked so that the carrier will readily pass the curves and switches.

GIANT SUSPENSION BRACKET — supports the Ridg-Rod Connecting Track Coupling. See page 165 for complete description.

TRIP BLOCK — is 9 inches long, is constructed of very best malleable iron and can be fastened to the Rod Track at any desired point.

ROD TRACK — for use outside of barn. Made of special drawn wire in two sizes, 0000 and 000000.

KEEPER RELEASE — a simple, unbreakable device which throws the keepers up as the carrier leaves the Steel Track for the Rod, preventing the tracker wheels from jumping the Rod Track and locking them in line. When the carrier returns to the Steel Track this device throws the keepers down so that the tracker wheels can pass the hangers and swivel on the curves.

SWITCHES, CURVES AND OTHER ACCESSORIES for STAR Double Oval Steel Track may be found on pages 164 and 165.

SWITCHES, CURVES AND OTHER ACCESSORIES for Rod Track may be found on page 166.

No. 592 Litter Carrier — weight complete, 160 pounds. Finished in gray enamel.

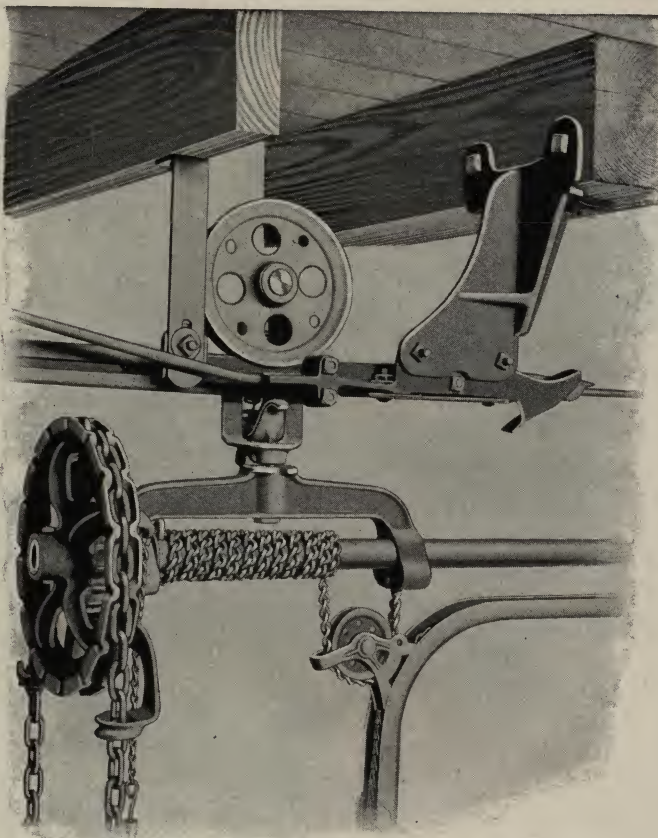


Fig. 600—Shows position of Spring Keepers and Suspension Bracket

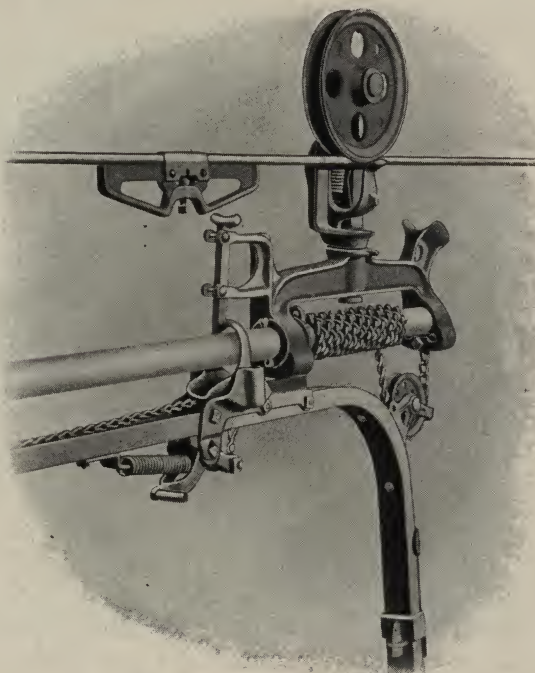
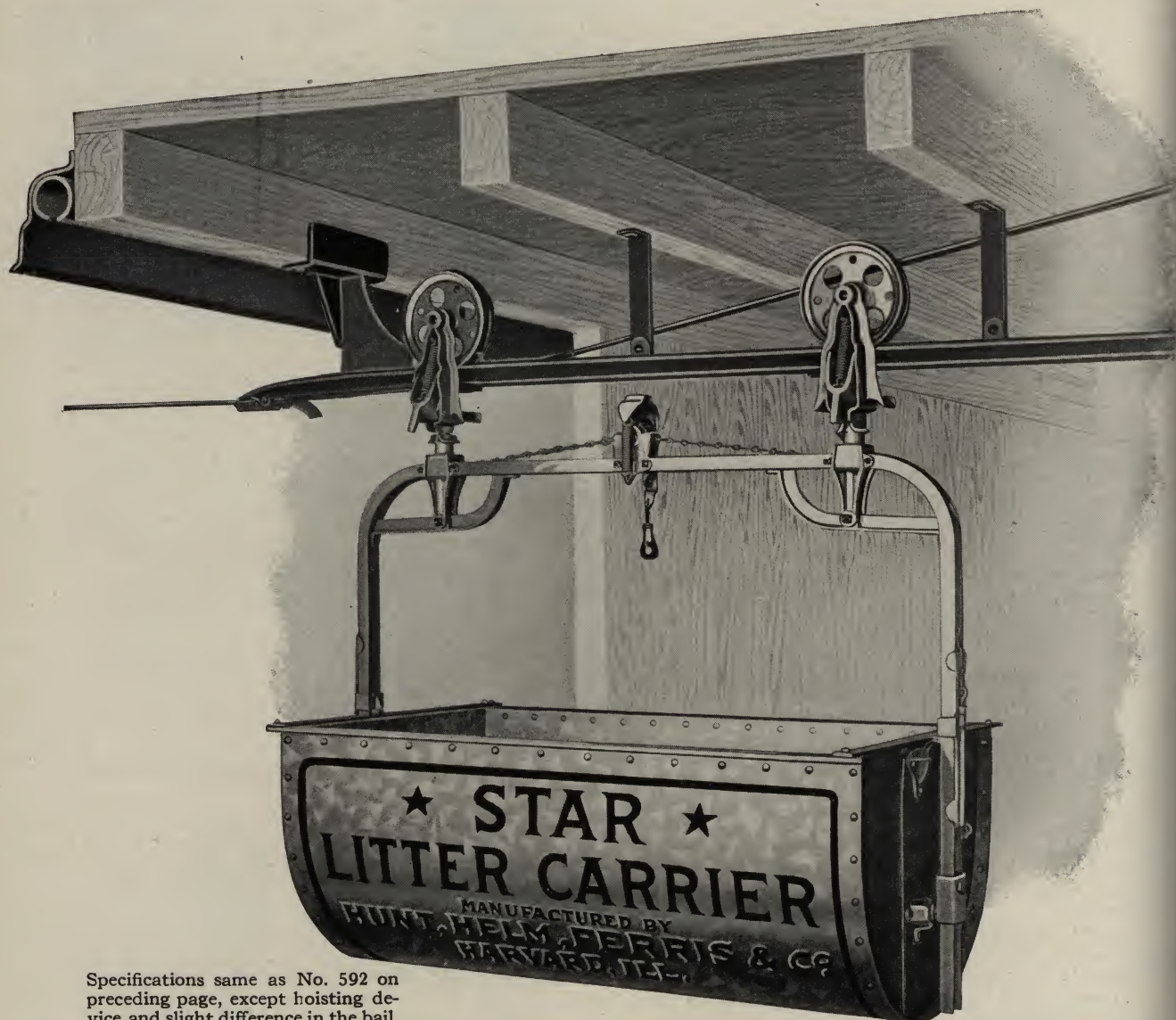


Fig. 599—Tripping Device



Specifications same as No. 592 on preceding page, except hoisting device and slight difference in the bail.

Reproduced from Actual Photograph of the

No. 693 Star Litter Carrier

Full Roller Bearing, for STAR Double Oval Steel Track Inside and Rod Track Outside

This Carrier Can Also Be Used on Rod Track Both Inside and Outside

THIS carrier was designed for operation on STAR Double Oval Steel Track inside the barn and Rod Track outside. With the exception that it is not equipped with the quick raising and lowering device, it is practically identical with the No. 592 STAR Litter Carrier illustrated and described on the

preceding pages, in both operation and results obtained. This carrier is fitted with an adjustable bail so that the tub can be raised or lowered, when desired, a total distance of about 12 inches. It is recommended and guaranteed to do the work satisfactorily and with a minimum amount of labor.

No. 693 Star Litter Carrier

(Continued)

SPECIFICATIONS

STAR DOUBLE OVAL STEEL TRACK—detailed description on page 164.

STAR DOUBLE OVAL STEEL TRACK HANGERS—which slide along the groove in the Double Oval Track, may be placed at any desired point. Detailed description may be found on page 164.

TRACKER WHEELS—of gray iron, 7 inches in diameter. These wheels have a lathe-turned tread. Each revolves on 12 cold rolled steel bearings so that the carrier runs smoothly and easily.

SPRING KEEPERS—attached to the swivel trucks. These are automatically thrown into place when the carrier leaves the Double Oval Track and runs onto the Rod. These keepers absolutely prevent the carrier from jumping the track, and also rigidly lock the wheels in line with the track and prevent their binding. When the carrier leaves the Rod Track for the Double Oval, these keepers are automatically thrown down by a device permitting the tracker wheels to pass the hangers. The wheels are unlocked at the same time so that the swivel trucks of the carrier will operate readily on the Curves and Switches.

TRIPPING LEVER—made of malleable iron. This lever is connected with chains which release the latches, which lock the tub at both ends of the bail. When this lever strikes the trip block attached to the rod track in the yard, the latches are released instantly and the tub is allowed to turn over before the carrier returns automatically to the barn. Note that when this tripping lever is thrown down at the trip block it remains down so as not to retard the return of the carrier. It is returned to its natural upright position by a down pull on the small knob attached for that purpose.

THE CHANNEL STEEL BAIL—for raising and lowering of the tub by means of a simple adjustment, a total distance in all of 12 inches.

BAIL LATCHES—The tub is held rigidly upright by latches locking both ends. A chain running in the groove of the bail connects both latches with the tripping lever and operates them in unison.

MALLEABLE BRACES—securely riveted to the arch of the bail, forming a very solid construction.

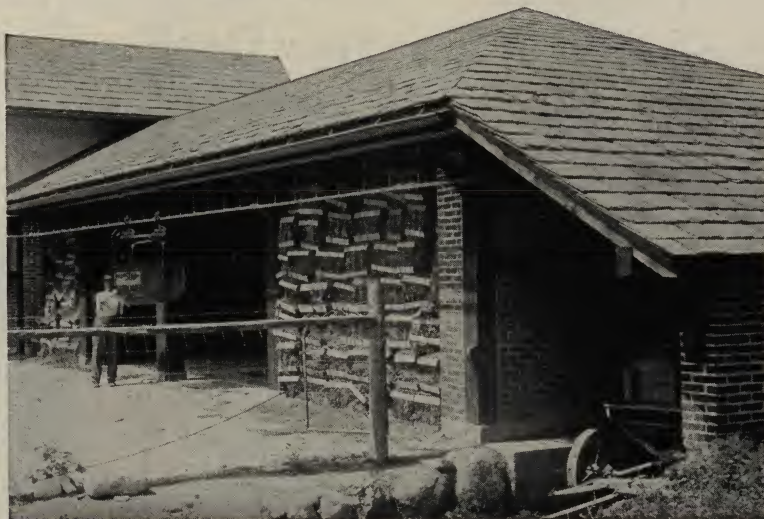
LITTER CARRIER TUB—is made of heavy galvanized steel, heavily reinforced at both ends. Measures 26 x 40 inches and is 14 inches deep, and is so shaped that it is self-cleaning when dumped. Capacity, 6 bushels.

GIANT SUSPENSION BRACKET—detailed description will be found on page 165.

SUPPORTS FOR WHEEL FRAME—which are riveted to both bail and bail braces, forming a rigid truss.

No. 693 STAR LITTER CARRIER—weight complete, 110 pounds. Finished in gray enamel.

No. 405 same as No. 693 with swivel trucks to run on rod track exclusively, in connection with rod track curves, angle brackets and spring track supports.



STAR Carrier with STAR Track Running to Spreader Shed



No. 593 Star Double Oval Steel Track

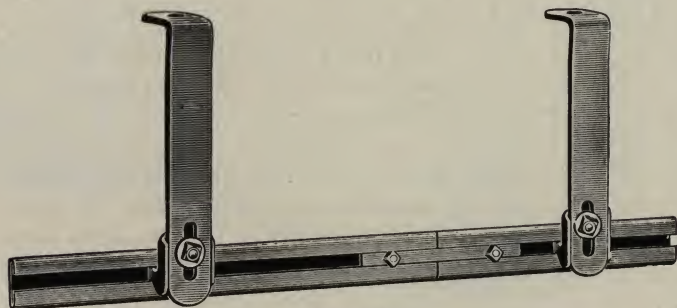


Fig. 593

STAR DOUBLE OVAL STEEL TRACK, a section of which is shown in Fig. 593, is used in connection with **RIDG-ROD CARRIERS**. Each section of track is formed of one piece of 14-gauge steel. The edges are rolled, leaving a slot which runs the full length of the piece. By rolling both edges, double rigidity is secured, the track having sufficient thickness as well as depth, so that it cannot sag nor buckle. Comes in 10 ft. lengths complete with splices. Weight per foot $1\frac{1}{2}$ lbs.

THE SPLICE—Made of an extra long piece of steel which fits inside the track and bolts to each section, making a perfect joint. We guarantee the track to be as strong at the splice as at any other point. Splices furnished free with all orders for track.

STAR DOUBLE OVAL STEEL TRACK HANGERS, illustrated in Fig. 593, are made of $\frac{1}{4} \times 1\frac{1}{2}$ -inch steel. The 9-inch hanger is adjustable in length from $7\frac{1}{2}$ to 9 inches and covers all ordinary requirements. Longer hangers, as listed below, are furnished when necessary. The track can be raised or lowered after it is put up, and carefully leveled. Lag screws $2\frac{1}{2} \times \frac{3}{8}$ -inches are used to fasten the hangers to the joists.

STAR Double Oval Steel Track Hangers furnished in following lengths:

Length	Weight per dozen	Cleats
9 inches.....	14 lbs.....	
15 ".....	20 ".....	6-in. beam
17 ".....	23 ".....	8-in. beam
19 ".....	26 ".....	10-in. beam
21 ".....	29 ".....	12-in. beam

Switches for Star Double Oval Steel Track

Switches for STAR Double Oval Steel Track are made of best grade malleable iron. The hinged section is quickly and easily operated by a down pull on either of the hand holds attached to the operating chain. When the switch is open, malleable iron safety locks automatically drop down, preventing the carrier from running off the open end. Both **TWO AND THREE-WAY SWITCHES** are furnished either right or left hand.

No. 598 **TWO-WAY SWITCH** for STAR Double Oval Track, either right or left hand. Weight, each, 25 pounds.

No. 597 **THREE-WAY SWITCH** for STAR Double Oval Track, either right or left hand. Weight, each, 30 pounds.

When ordering, refer to page 169.

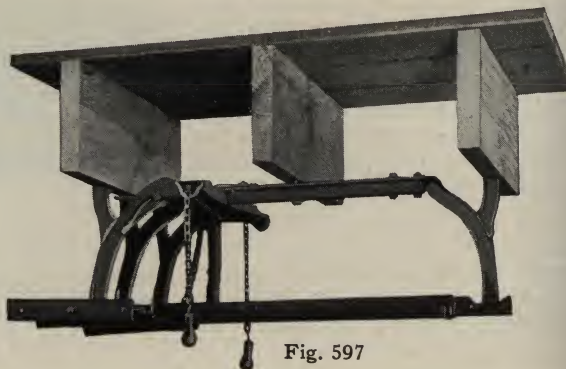


Fig. 597

No. 596 Curve for Star Double Oval Steel Track



Fig. 596

FIGURE 596 illustrates Curve for STAR Double Oval Steel Track, which is made of high carbon, round edge steel, size $\frac{1}{4} \times 1\frac{1}{2}$ inches. This curve may be bent to any angle. It takes the place of eight feet of track. The ends of the curve are bolted into the ends of the regular

STAR double oval track, making a rigid connection at each point.

The weight of the STAR Double Oval Steel Track Curve, complete, is 15 lbs. Hangers are packed separately and are not included with the curve.

Giant Suspension Bracket

FIGURE 595 illustrates the Giant Suspension Bracket which is used to support the connection between double oval steel track in the barn and rod track outside.

The illustration here shows rod track secured to suspension bracket with coupling about to be placed in position. One end of this coupling fits snugly over the rod track. It is provided with an attachment which holds the rod track securely in place. The other end of the coupling fits into the end of the Double Oval Track and is bolted in place same as a splice, thus making a perfect and rigid joint.

If the sill to which the Giant Suspension Bracket is bolted is not perfectly level, the track connection can be leveled by the adjustment allowed in bolting it to the bracket. The coupling is so constructed that the keepers on the carrier are thrown down automatically as the carrier enters the barn. See Fig. 600 on Page 161.

The construction of the Giant Suspension Bracket and Coupling provides for a straight and smooth run from inside of barn to dump. There is no offset at barn door where rod and Double Oval track join. This is an exclusive patented feature with Star construction and solves the problem of a smooth connection at the door, which makes it possible to gather headway with the loaded carrier before it is given the final shove to the dump.

Giant Suspension Brackets are made either right or left hand. Right or left hand brackets are necessary because the frames supporting the tracker wheels on the carriers must, under all conditions, operate on the side of the track opposite to the side into which the track hangers attach. The right hand bracket is placed on the right hand side of the track looking out of barn. See Figure 594. The left hand bracket is placed on the left hand side of track looking out of barn. See Figure 702.

Either right or left hand suspension brackets will

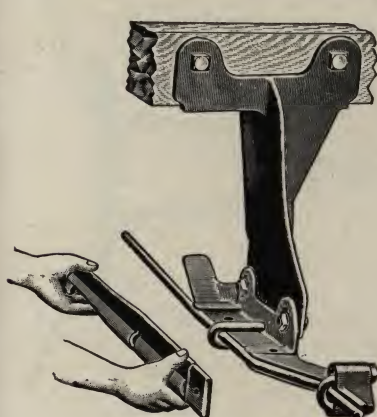


Fig. 595

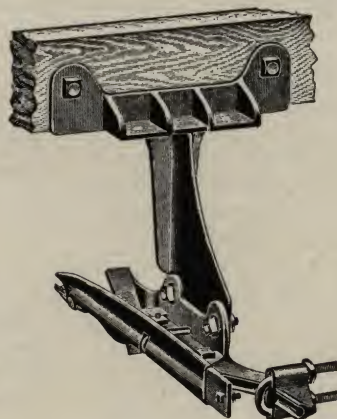


Fig. 594
Right Hand Giant Suspension Bracket
Looking Out of Barn

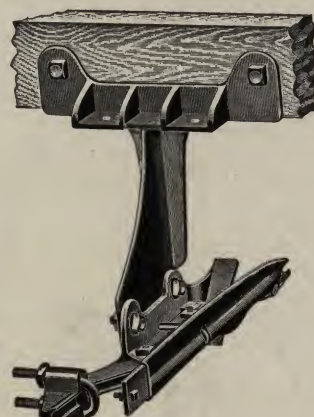


Fig. 702
Left Hand Giant Suspension Bracket
Looking Out of Barn

The keepers being thrown down, permit the carrier trucks to pass the hangers which support the Double Oval Track and also allow them to swivel at curves. As the carrier leaves the barn, the keepers are thrown up into place so that the wheels cannot jump the rod track. The wheels are locked into line with the rod at the same time. This keeps them from binding, and reduces friction to a minimum.

answer where switches are not used. If switches are used, it is always best to include a rough pencil sketch with the order to indicate the general direction that the track takes inside of the barn, in which case the proper suspension bracket and also the proper switch will be included in the shipment.

Giant Suspension Bracket, either right or left hand, weight, each, 15 lbs.

Rod Track Accessories



Fig. 342

Fig. 342 illustrates the STAR Loop Clamp by means of which a loop can be formed quickly at either end of the rod track. Weight, each $1\frac{3}{4}$ pounds.

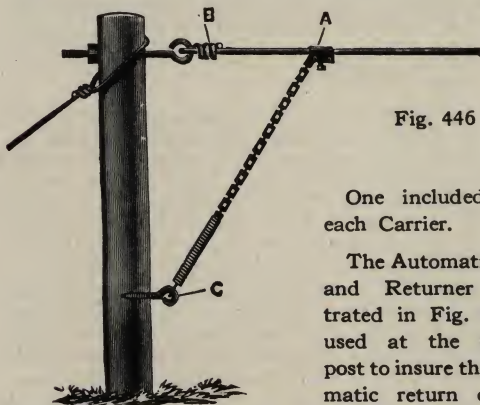


Fig. 446

One included with each Carrier.

The Automatic Stop and Return illustrated in Fig. 446 is used at the anchor post to insure the automatic return of the carrier to the barn. This returner prevents the carrier from striking the anchor post and furnishes the necessary momentum for the automatic return without any tendency towards running the carrier off the rod. Weight, each $3\frac{1}{2}$ pounds.

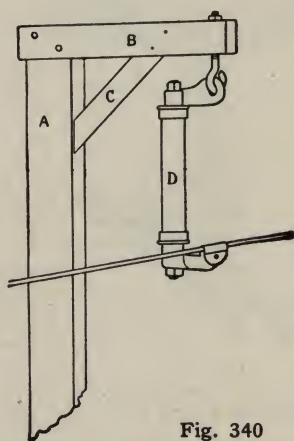


Fig. 340

Spring Track Support, Fig. 340, is used to take up the sag in rod tracks over 125 feet in length. Weight, each, $8\frac{1}{4}$ pounds.

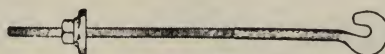


Fig. 364

Tension Bolt, Fig. 364. Length 30 inches. Thickness, $\frac{7}{8}$ inch. Complete with washer and nut. Weight, each, $6\frac{1}{2}$ pounds.

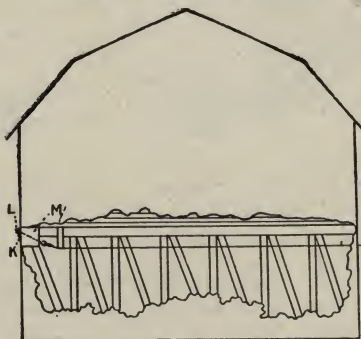


Fig. 352 shows attachments of a rod track in barn and in yard.

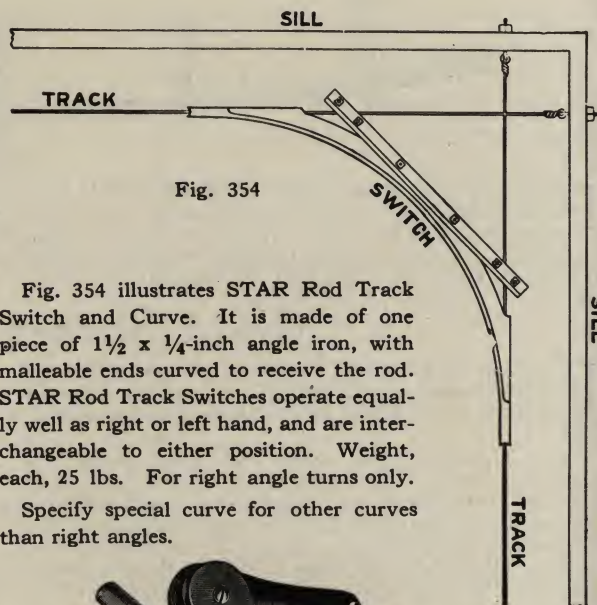


Fig. 354

Fig. 354 illustrates STAR Rod Track Switch and Curve. It is made of one piece of $1\frac{1}{2} \times \frac{1}{4}$ -inch angle iron, with malleable ends curved to receive the rod. STAR Rod Track Switches operate equally well as right or left hand, and are interchangeable to either position. Weight, each, 25 lbs. For right angle turns only.

Specify special curve for other curves than right angles.



Fig. 423

Clamp for Rod Track, Fig. 423, is used at the intersection of two rod tracks to prevent sagging. Weight, each, 5 ounces.

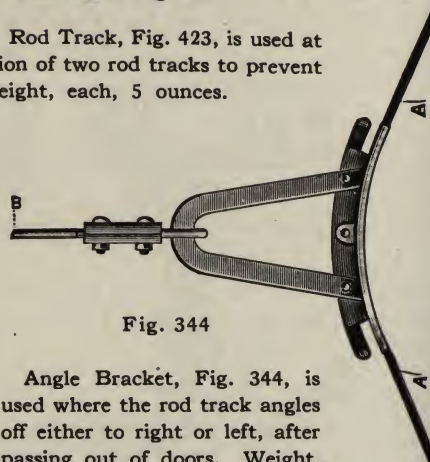


Fig. 344

Angle Bracket, Fig. 344, is used where the rod track angles off either to right or left, after passing out of doors. Weight, each, $3\frac{1}{2}$ pounds.

Rod Track Anchors

THE successful working of a Rod Track outfit depends upon the ends of the rod being properly secured so as to prevent unnecessary sagging. In the yard an anchor post of suitable height should be used so that the end of the rod at the post can be elevated about 15 inches for every 100 feet of rod used above the end secured in the barn. This elevation insures the automatic return of the carrier after the tub is dumped.

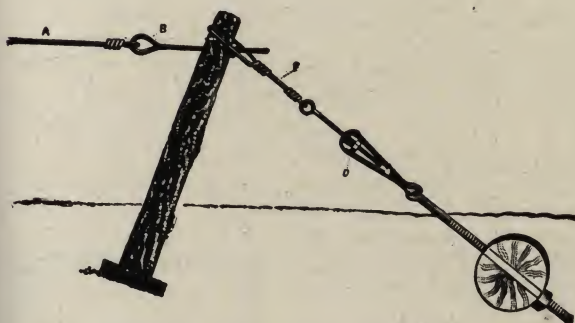


Fig. 353.—Rod Track, Anchor Rod and Turnbuckle

The Anchor Rod and Turnbuckle illustrated in Fig. 353 should by all means be specified. In addition to the 36-inch tension bolt used in connection with the turnbuckle for take-up purposes, a $\frac{5}{8}$ -inch steel rod extends from the top of the ground, down thru the dead log. This steel rod will not rust out or break and overcomes any possibility of the anchor giving away below the ground line. Weight, each, 35 pounds.

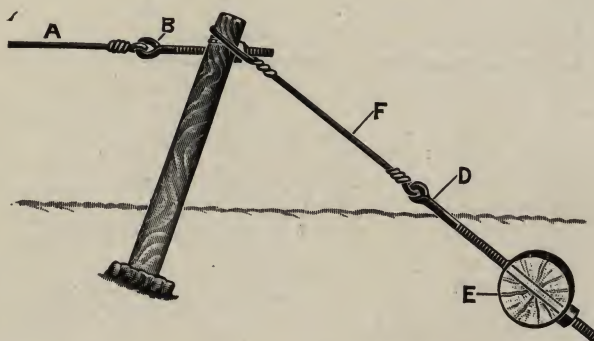


Fig. 375.—Anchor Rod and Tension Bolt

Fig. 375 illustrates a medium priced anchor for supporting the anchor post in the yard. This anchor is furnished with a looped piece of rod track and with a 36-inch tension bolt, which extends through the dead log. Weight, each, 12 pounds.

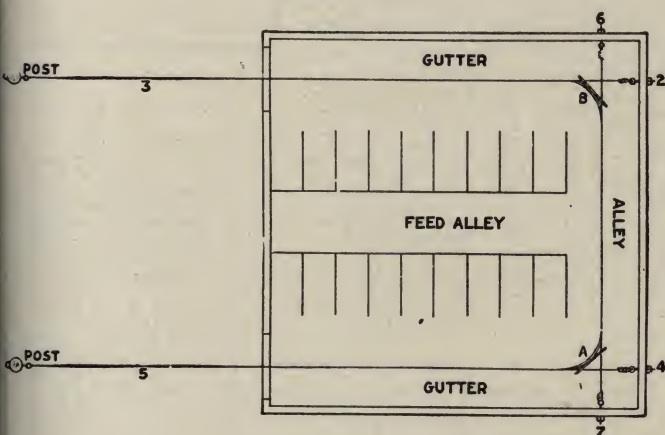


Fig. 356

Fig. 356 shows an illustration of a STAR Rod Track Litter Carrier outfit. Where one carrier is used for both sides of the barn, this arrangement is economical and practical.

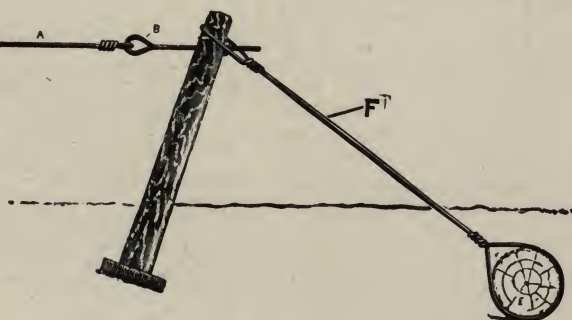
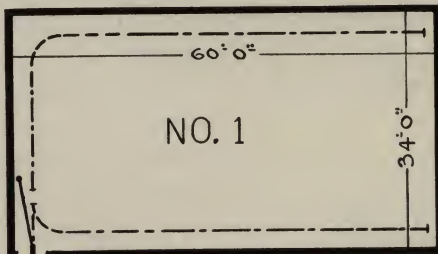


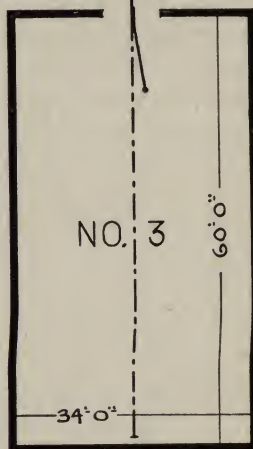
Fig. 374.—Anchor Rod

Anchor Rod, Fig. 374, illustrates a moderate priced method of anchoring post when supporting end of rod. This anchor is furnished complete with loops at either end. While not as convenient as the rod track turnbuckle, Fig. 353, it can be made to answer the purpose nicely. Weight, each, 10 pounds.

Material Required For Star Double Oval and Rod Track

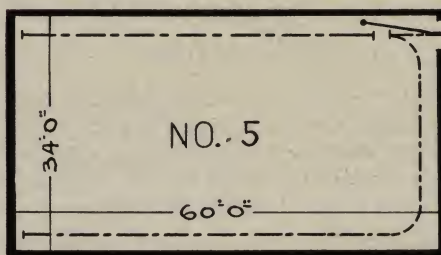


- No. 1**
- | | | |
|---------------|------|--|
| 1 | 592 | Star Litter Carrier. |
| 130 ft. | 593 | Star Double Oval Track. |
| 2 | 596 | Curves. |
| 75 | 599 | 17 in. Track Hangers. |
| 2 | 884 | Stop Blocks. |
| 1 | 598L | Two-Way Switch (left hand). |
| 1 | 594 | Giant Suspension Bracket (right hand). |
| 50 ft. 000000 | | Rod Track. |
| 2 | 364 | Tension Bolts. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |
- Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.

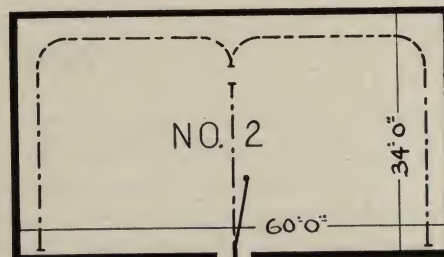


- No. 3**
- | | | |
|---------------|-----|--|
| 1 | 592 | Star Litter Carrier. |
| 60 ft. | 593 | Star Double Oval Track. |
| 31 | 599 | 17 in. Track Hangers. |
| 1 | 884 | Stop Block. |
| 1 | 594 | Giant Suspension Bracket (right hand). |
| 50 ft. 000000 | | Rod Track. |
| 2 | 364 | Tension Bolts. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |
- Add 2 feet of track and 1 hanger for each 2 feet that the barn is longer than 60 feet.

- No. 5**
- | | | |
|---------------|-----|---------------------------------------|
| 1 | 592 | Star Litter Carrier. |
| 130 ft. | 593 | Star Double Oval Track. |
| 7 | 596 | Curves. |
| 15 | 599 | 17 in. Track Hangers. |
| 2 | 884 | Stop Blocks. |
| 2 | 598 | Two-Way Switch (right hand). |
| 1 | 702 | Giant Suspension Bracket (left hand). |
| 50 ft. 000000 | | Rod Track. |
| 2 | 364 | Tension Bolts. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |
- Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.



With track arranged as shown (except in figure No. 4) the loaded carrier given a shove at the door will run out to the post, dump and return automatically.



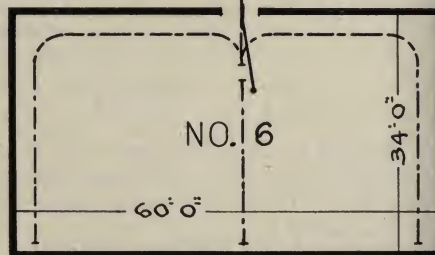
- No. 2**
- | | | |
|---------------|------|---------------------------------------|
| 1 | 592 | Star Litter Carrier. |
| 110 ft. | 593 | Star Double Oval Track. |
| 4 | 596 | Curves. |
| 75 | 599 | 17 in. Track Hangers. |
| 2 | 884 | Stop Blocks. |
| 1 | 598L | Two-Way Switch (left hand). |
| 1 | 702 | Giant Suspension Bracket (left hand). |
| 50 ft. 000000 | | Rod Track. |
| 2 | 364 | Tension Bolts. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |
- Add 6 feet of track and three hangers for each additional 2 feet that the barn is wider than 34 feet. Deduct the same for narrower barn.

- No. 4**
- | | | |
|----------------|-----|--|
| 1 | 592 | Star Litter Carrier. |
| 120 ft. | 593 | Star Double Oval Track. |
| 62 | 599 | 17 in. Track Hangers. |
| 2 | 884 | Stop Blocks. |
| 1 | 702 | Giant Suspension Bracket (left hand). |
| 1 | 594 | Giant Suspension Bracket (right hand). |
| 110 ft. 000000 | | Rod Track. |
| 3 | 364 | Tension Bolts. |
| 1 | | Special Rod Track Curve with Keeper Release for 592 Carrier. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |
- Add 2 feet of track and 1 hanger for each foot that the barn is longer than 60 feet. Deduct the same for a shorter barn.

- No. 6**
- | | | |
|---------------|------|--|
| 1 | 592 | Star Litter Carrier. |
| 110 ft. | 593 | Star Double Oval Track. |
| 4 | 596 | Curves. |
| 75 | 599 | 17 in. Track Hangers. |
| 3 | 884 | Stop Blocks. |
| 1 | 597L | Three-Way Switch (left hand). |
| 1 | 594 | Giant Suspension Bracket (right hand). |
| 50 ft. 000000 | | Rod Track. |
| 2 | 364 | Tension Bolts. |
| 1 | 353 | Anchor Rod and Turn-Buckle. |

(No. 6—Cont.)

Add 6 feet of track and three hangers for each additional 2 feet that the barn is wider than 34 feet. Deduct the same for narrower barn.



Star rigid track carriers can be installed in any barn. If your lay-out is different than any of the above send us a rough sketch of it, including dimensions for complete figures and prices.

How to Order Carriers and Accessories for Star Double Oval Steel Track and Rod Track

Send a Rough Sketch With Your Order Showing Where Track is to Run.

CARRIER — Select by referring to pages 160 to 162.

TRACK—DOUBLE OVAL STEEL TRACK — To determine the amount of Double Oval Steel Track for use inside of barn, take measurements as though the track were to be installed with square turns, then deduct 8 feet of track for each curve not used in connection with a switch and 4 feet of track for each curve used with a switch. Double Oval Steel Track is furnished in 10-foot lengths only. By means of a hack saw shorter lengths can be cut as desired.

TRACK HANGERS — STAR Double Oval Steel Track Hangers, Fig. 593, are used to support the track inside the barn. These hangers should be spaced from 18 inches to 2 feet apart, according to the spacing of the joists. Nine inch hangers are sufficiently long except where it is necessary for the carrier to clear the beams supporting the joists. By referring to page 164 you can determine the length hanger necessary to clear any size beam.

GIANT SUSPENSION BRACKETS — A Giant Suspension Bracket, either right or left hand, is necessary at each point where the carrier runs from the Double Oval Steel Track, used inside of the barn, to the Rod Track, used outside. Either a right or left hand suspension bracket will answer where switches are not used. Right hand suspension brackets are placed on the right hand and left hand suspension brackets are placed on the left hand side of the track looking out of the barn. Where switches are used, it is always best to include a rough pencil sketch with the order to indicate the general direction the track takes inside the barn so that proper suspension bracket will be included in the shipment.

END STOP — Specify one end stop, Figure 590, to keep carrier from running off end of Double Oval Track.

CURVES — Specify curve for Double Oval Steel Track at each point where the main track angles off. Also specify a curve for each 2 way switch and 2 curves for each 3 way switch used. These curves are shipped straight so they can be bent either to right or left and to any angle required.

SWITCHES — Switches for Double Oval Track, either 2 or 3 way, are furnished either right or left hand. Specify 2 way switch where the track branches off to either right or left of the main line. Specify 3 way switch where track branches off to both right and left of the main line. Right hand switches, either 2 or 3 way, are used with right hand suspension brackets when the hinged end of the switch is nearest the

suspension bracket. Right hand switch, either 2 or 3 way, is required when the hinged end of the switch is furthest away from a left hand suspension bracket. Left hand switch, either 2 or 3 way, is used with a left hand suspension bracket when the hinged end of the switch is nearest the suspension bracket. Left hand switch, either 2 or 3 way, is used where a right hand suspension bracket is used and where the hinged end of the switch is furthest away from the suspension bracket.

When ordering switches, it is always better to send a rough pencil sketch to indicate the general direction the track takes inside the barn, in which case the proper switches, also the proper suspension brackets, will be included in the shipment.

REMOVABLE SECTION — A removable section is a short piece of track arranged so that it can be lifted out, allowing a sliding door to be closed. While we do not illustrate a removable section for use with Double Oval Track, it can be furnished, if desired.

ROD TRACK — When ordering Rod Track for use out of doors, be sure to add at least 10 to 15 feet to the length required to provide for a suitable anchorage inside of the barn. The 0000 Rod Track is the size commonly used. It measures $1\frac{1}{32}$ in. diameter. The 000000 track, measuring $1\frac{5}{32}$ in. diameter, makes a stronger job.

TENSION BOLT — Specify two 30-inch tension bolts for each stretch of Rod Track—one to be used at anchor post in the yard, the other to secure the Rod Track in the barn.

AUTOMATIC STOP AND RETURNER — Furnished with each carrier. See Figure 446, page 166.

ANCHOR ROD — Order one anchor rod for each stretch of Rod Track.

We recommend the Anchor Rod and Turnbuckle, Fig. 353, page 167, as being the most practical.



Double Oval Track CAN Be Used In Combination With Rod Track



STAR Equipped Barn at Hazelton's Ideal Farms, Freeport, Illinois. Photographed after eight years' use of equipment.



The STAR Equipped Barn at Peaceful Vista Farm, Owned by W. J. Brown, Detroit



One of the Large STAR Equipped Barns at Otterbein Home, Lebanon, Ohio.



STAR Stalls, Norris Farm Camp, Mukwonago, Wis., Showing Posts in Stall Row.



Cows Lying Down in STAR Equipped Barn of Mr. George Harris, Worcester, Mass.



STAR Equipped Barn at Green Gables (Wm. Wrigley Estate) Lake Geneva, Wisconsin



STAR Stalls,
Carriers and Water
Bowls in the New
Test Barn.



Pens in the Calf Barn.

STAR Stalls
After Eleven
Years' Service in
the Old Round
Barn.



STAR Equipment in Three Barns at the University of Illinois, Champaign, Ill.



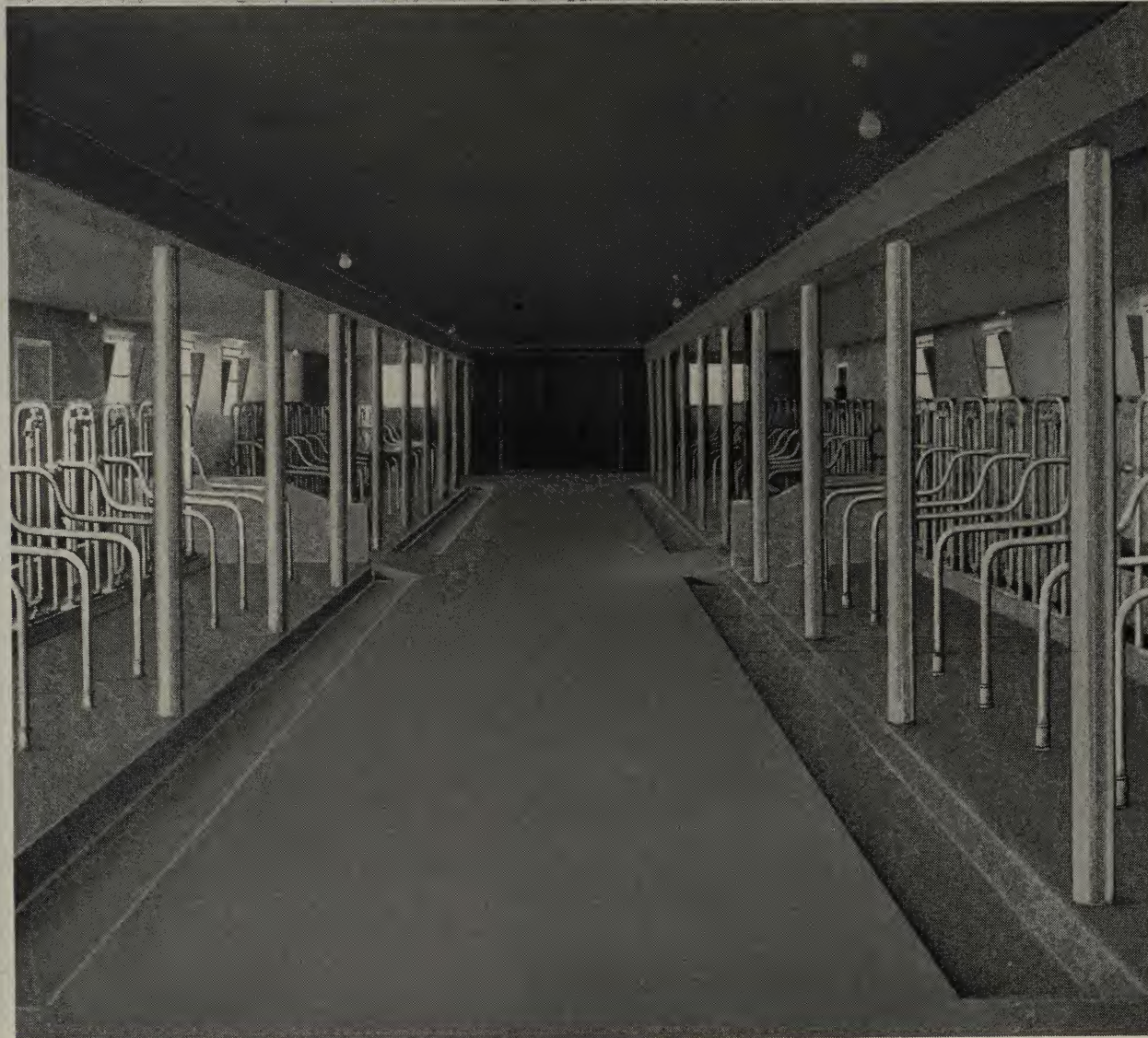
STAR Equipped Barn of Mr. H. Krienke at Hutchinson, Minn.





STAR Pens in One of the STAR Equipped Barns, Ohio State Hospital, Toledo, Ohio.

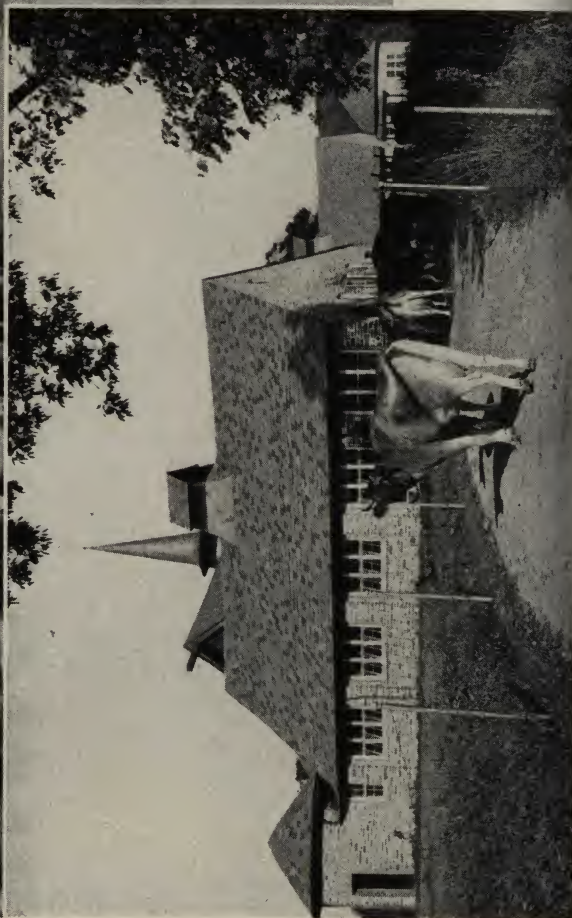


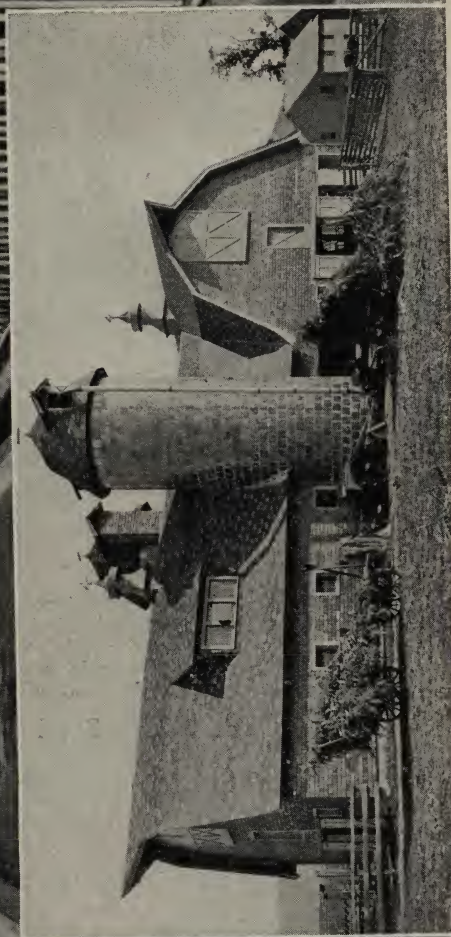
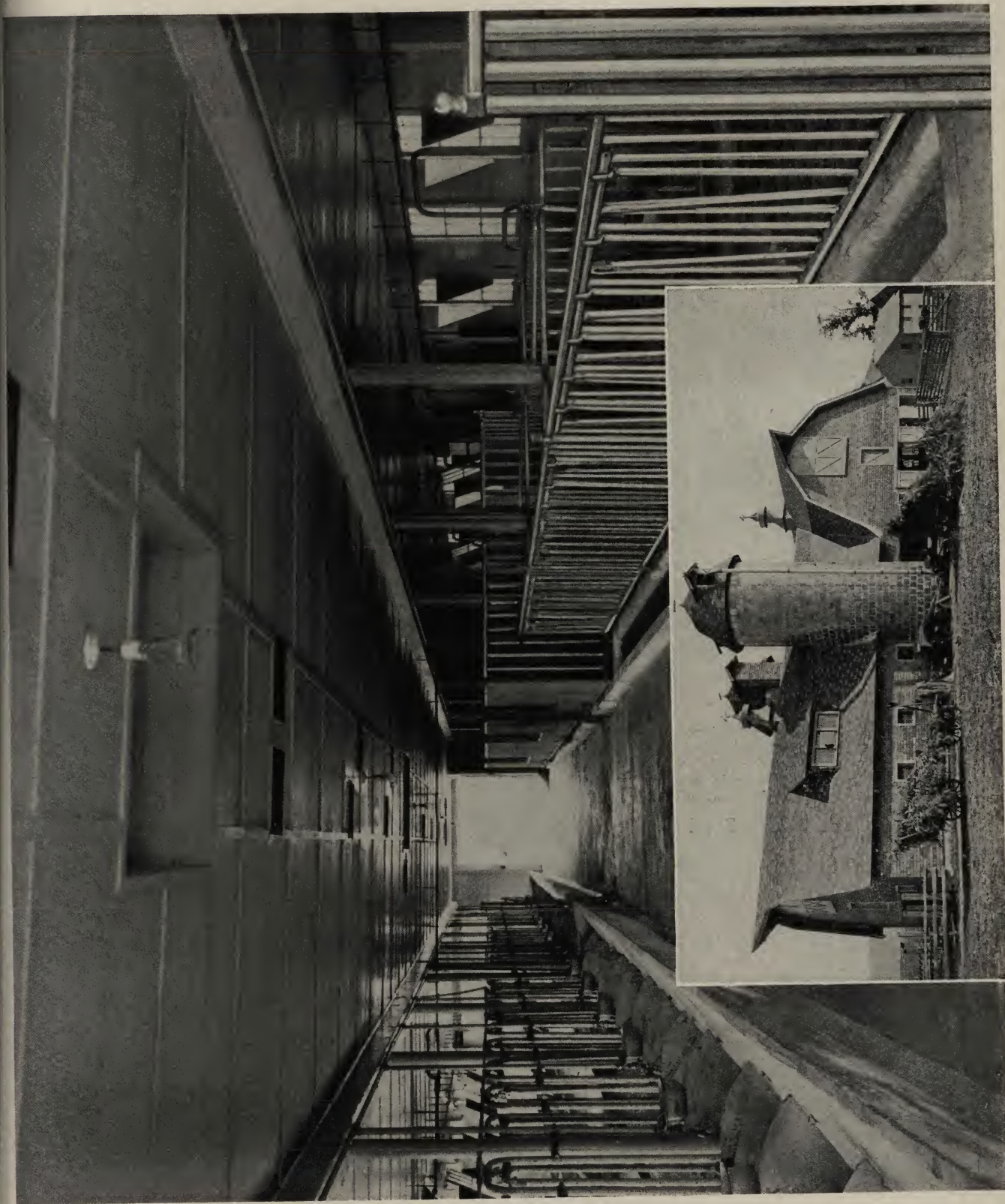


STAR Equipment in the Barns of State Penitentiary, Bismarck, No. Dak.



STAR Equipped Dairy Barn,
Vincent Astor Estate,
Rhinebeck, New York.





STAR Equipped Barn of Judge Healey, Mohawk Trail, Near Shelburne, Mass.



STARLINE INC.



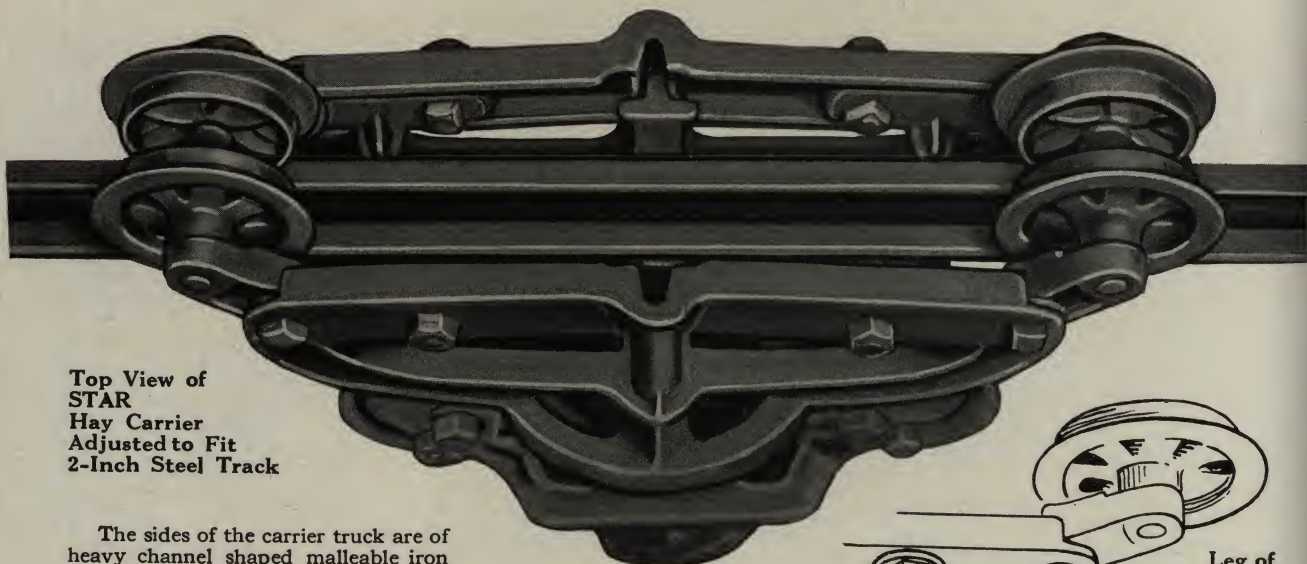
Star Hay Tools

STAR Hay Carriers are backed by years of service and a guarantee of absolute satisfaction. Many of them are still in use after more than forty years of service.

They are built extra strong—with the extra strength just where it is needed. They remain in service long after ordinary hay carriers would be worn out. They come back every year after their months of idleness ready to go and do the heavy work that is thrown upon them without delay or expense.

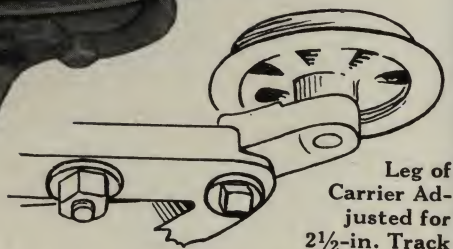
Run Best On Any Kind of Steel Track

Star Hay Carriers as now made are adjustable in width to fit any make of steel track so that no farmer need be deprived of the time-saving, trouble-saving advantages of handling hay the modern way with a new Star Carrier without the trouble and cost of replacing his old track.



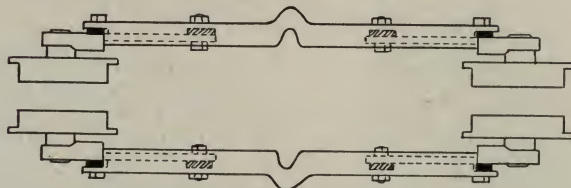
Top View of
STAR
Hay Carrier
Adjusted to Fit
2-Inch Steel Track

The sides of the carrier truck are of heavy channel shaped malleable iron with the throat of the channel facing the center. Into these channels are fitted heavy brackets to which the track wheels are attached.



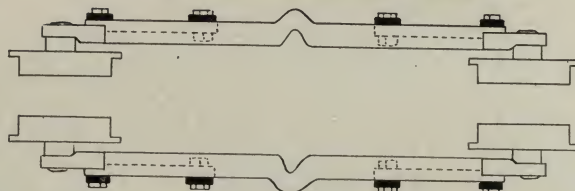
Leg of
Carrier Ad-
justed for
2 1/2-in. Track

For 2-inch Steel Track



Four heavy bolts hold each bracket securely in place. When each bolt is applied, a thick washer placed between the bracket and frame as shown in above diagram holds the wheel in just the right position so that the carrier fits and works on any 2-inch steel track.

For 2 1/2-inch Steel Track



By loosening the bolts which hold the wheel brackets to the track frame and placing the heavy washers on the outside as shown in above diagram, the wheels are held in proper position for the carrier to fit and operate on any 2 1/2-inch steel track.

Be Sure To Use The Correct Trip Block

Star Carriers, unless otherwise specified will have trip block for Star Double Flange Track. Be sure to specify proper trip block if for use on any other make. Dealers keep in stock trip blocks to fit the kinds of stock which have been used the most in their vicinity. Trip blocks for all tracks are shown on the next page.

Trip Blocks for Star Hay Carriers on Steel Tracks

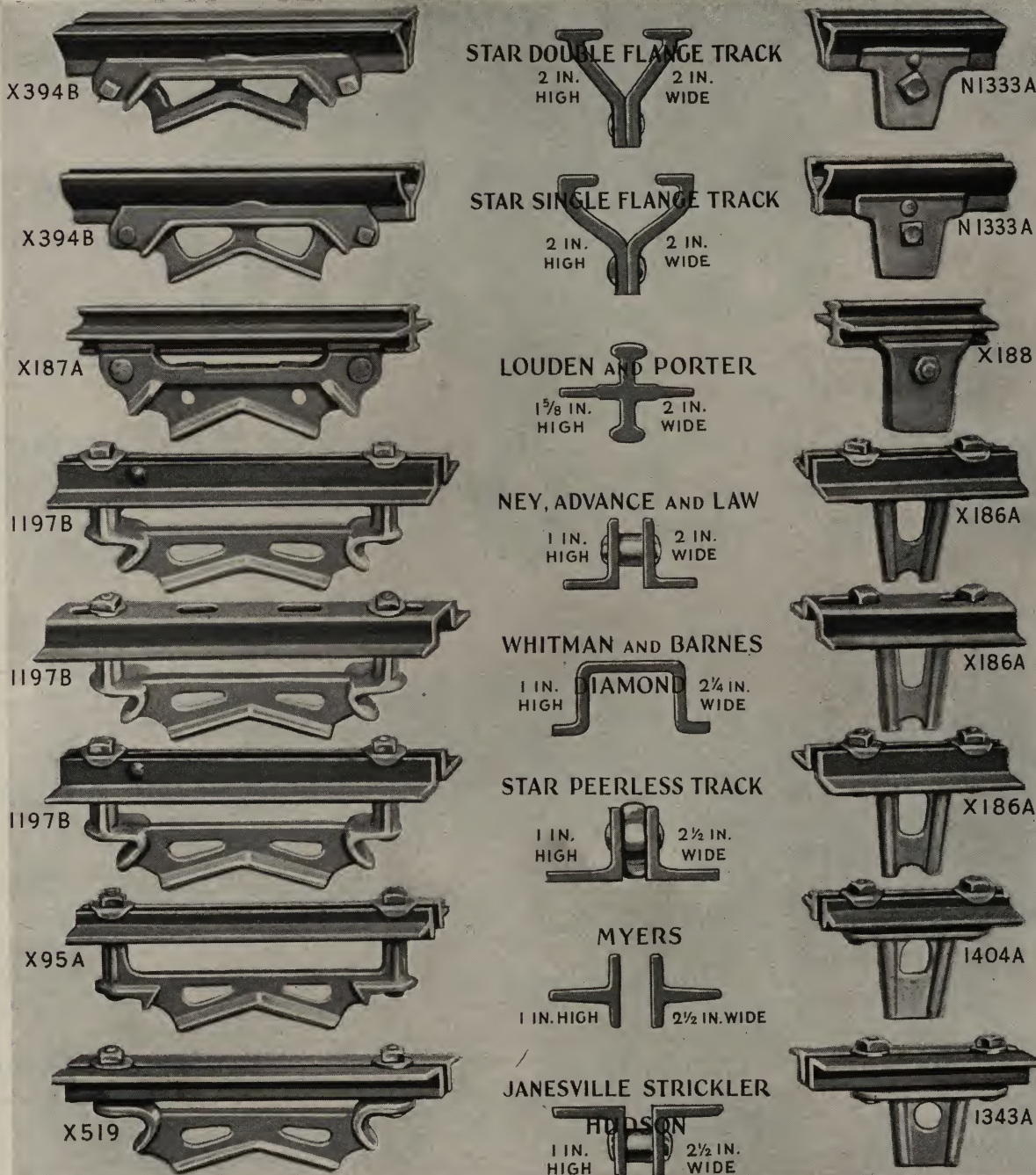
STAR carriers used with either forks or slings can be very profitably used to replace old carriers which have served their time and become worn and useless or which do not handle the hay as well as these modern, up-to-date Star Carriers

FOR NOS. 493A AND 564A

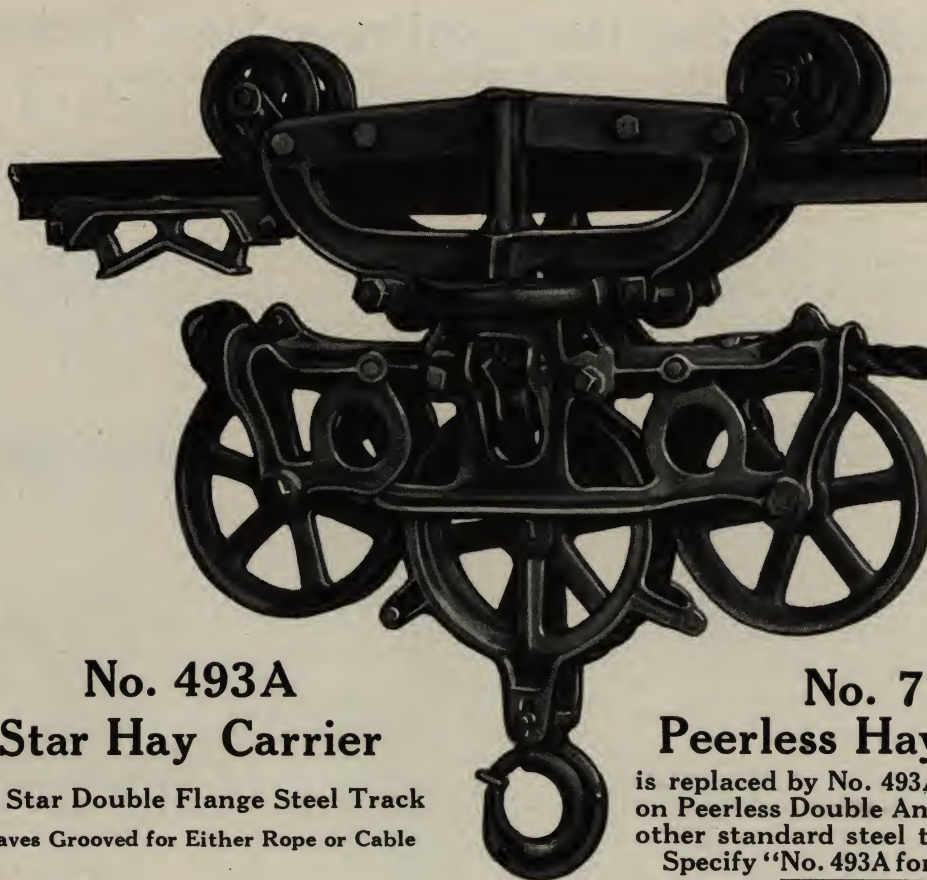
shown on the following pages of this catalog.

In many cases the old track is still in good shape. So the latest Star Carriers are being made with trucks that are adjustable in width provided with trip blocks for steel track as shown in the following illustrations.

FOR NOS. 687A, 1045A, 1134A AND 1212A



FOR TRACKS DIFFERENT THAN ABOVE lay a piece of heavy cardboard over end of track and batter it with a piece of wood so impression in cardboard will show just what track is.



No. 493A Star Hay Carrier

For Star Double Flange Steel Track
Sheaves Grooved for Either Rope or Cable

No. 710 Peerless Hay Carrier

is replaced by No. 493A which operates
on Peerless Double Angle track, or any
other standard steel track.

Specify "No. 493A for Peerless Track."
Also operates on any other standard
steel track.

See Page 185 for trip blocks.



Fig. 561

Fig. 561 shows man-
ner in which lock en-
gages fork pulleys and
holds load.

SPECIFICATIONS

NAME—Star, No. 493A.

STYLE—Reversible Fork Carrier for Steel Hay Carrier Track.

FRAME—Best grade malleable iron, fully reinforced.

HARVESTER NUT LOCK—Special Star Feature used to prevent the frame bolts from working loose. This is an exclusive feature with all Star Carriers and insures absolute rigidity.

WHEEL BASE—15½ inches, center to center.

TRACKER WHEELS—Best gray iron, 3 inches in diameter at the tread, hub drilled to take special steel axle.

AXLE—This is a lathe-turned steel axle made by the most modern automatic machinery.

SHEAVES—7 inches in diameter, best gray iron, drilled to take steel axle. The three large sheaves on this Carrier are grooved for both 7⁄8-inch rope and 3⁄8-inch wire cable.

BEARINGS—The sheaves revolve on 5⁄8-inch turned steel axle.

FORK PULLEY—Improved design, fitted with 7-inch roller bearing sheave and self-closing fork hook.

SELF-CLOSING FORK HOOK—Special feature with all Star Carriers. By the use of this hook, the fork may be quickly detached. Much superior to the ordinary methods of attaching fork.

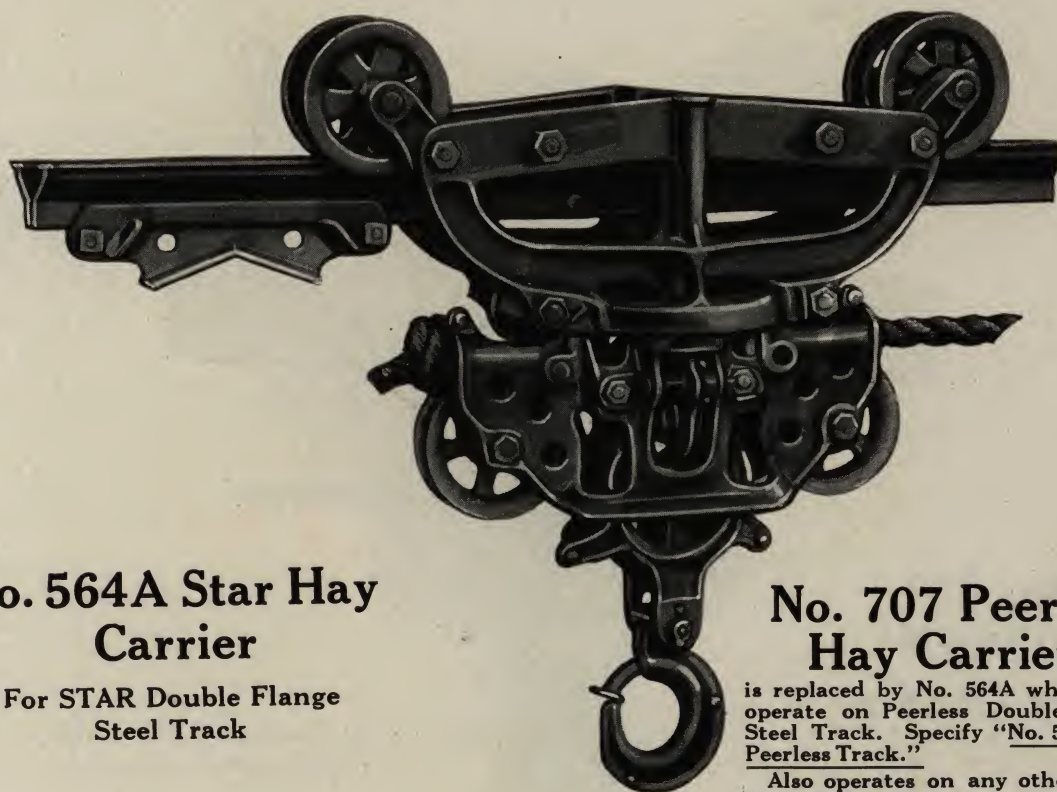
LOCK—Improved type of gravity lock. No springs to rust out or break. This lock embraces the double grapple principle, permitting pulley to enter at any angle and holding it securely. Simple in construction and positive in action.

TRIP-BLOCK—Made of best malleable iron, of special design, with a depression on the under side bolting over a rivet head on the track, thus making it absolutely impossible to loosen.

ROPE—This Carrier is fitted with sheaves so designed that it may be used with either 3⁄4-inch or 1⁄2-inch manila rope or 3⁄8-inch wire cable and without any changing of the carrier.

FINISH—Aluminum.

WEIGHT—Each, 52 lbs.



No. 564A Star Hay Carrier

For STAR Double Flange Steel Track

No. 707 Peerless Hay Carrier

is replaced by No. 564A which will operate on Peerless Double Angle Steel Track. Specify "No. 564A for Peerless Track."

Also operates on any other standard steel track.
See page 185 for trip blocks.

SPECIFICATIONS

NAME—STAR, No. 564A.

STYLE—Reversible Fork Carrier for STAR Double Flange Steel Hay Carrier Track. Four-inch sheaves with frame of best grade malleable iron, fully reinforced. Frame provided with nut locks to prevent bolts from working loose, an exclusive feature on all STAR Carriers, which insures absolute rigidity.

WHEEL BASE— $15\frac{1}{2}$ inches, center to center, with tracker wheels of best gray iron, 3 inches in diameter, the hub drilled to take special steel axle.

SHEAVES—Four-inch best gray iron sheaves. Revolve on $\frac{5}{8}$ -inch turned steel axle.

FORK PULLEY—Latest design, mounted in heavy frame, fully reinforced. The fork pulley is supplied with self-closing fork hook, a special feature with all STAR Carriers.

LOCK—Improved type of gravity lock. No springs to rust or break. This lock embraces the double grapple principle, permitting pulley to enter at any angle and holding it securely. Simple in construction and positive in action.

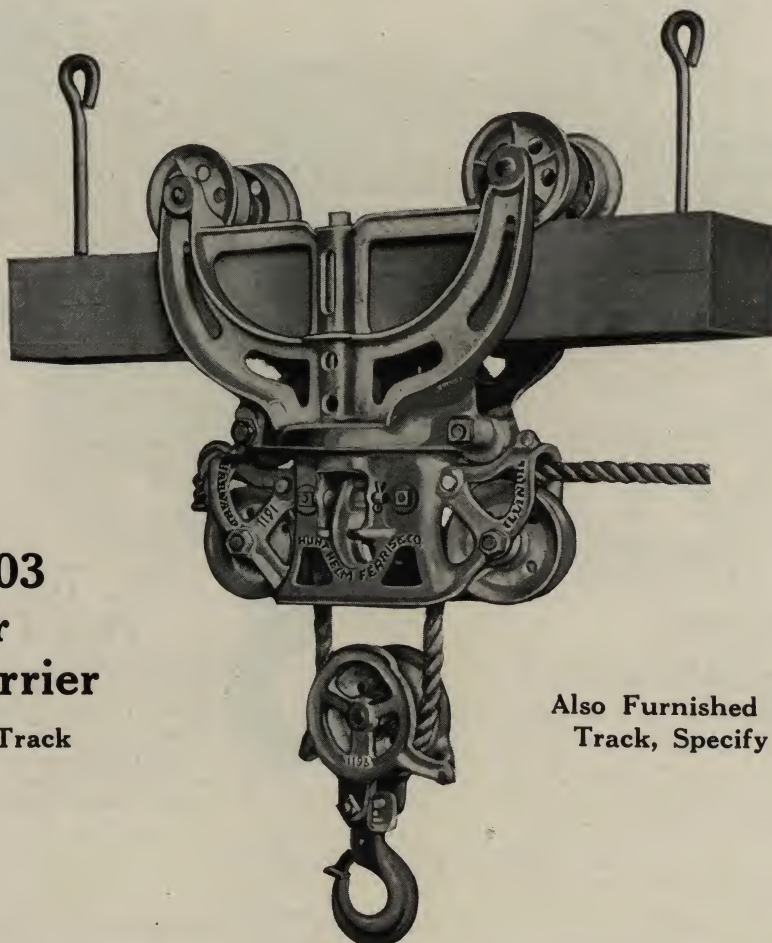
TRIP BLOCK—Made of best malleable iron, of special design, with a depression on the under side bolting over a rivet head on the track, thus making it absolutely impossible to loosen.

ROPE—This Carrier is designed for use with rope and we recommend $\frac{3}{4}$ or $\frac{7}{8}$ -inch manila as being the most serviceable.

FINISH—Aluminum, trimmed in blue.

WEIGHT—39 pounds.

**No. 503
Star
Hay Carrier
For Wood Track**



Also Furnished for Cable
Track, Specify No. 504

SPECIFICATIONS

NAME—STAR, No. 503.

STYLE—Reversible Fork Carrier for Wood Track.

FRAME—Best grade malleable iron, fully reinforced.

STAR NUT LOCK—Special STAR Feature used to prevent the frame bolts from working loose. This is an exclusive feature with all STAR Carriers and insures absolute rigidity.

WHEEL BASE—12 inches, center to center.

TRACKER WHEELS—Best gray iron, 3 inches in diameter at the tread, wide flange, hub drilled to take steel axle.

AXLE—This is a lathe-turned axle, made by the most modern automatic machinery.

SHEAVES—4 inches in diameter. Best grade gray iron, drilled to take $\frac{5}{8}$ -inch turned steel axle.

FORK PULLEY—Latest design, mounted in heavy frame which is reinforced at locking portion. All fork pulleys are supplied with self-closing fork hooks for holding fork, including a universal joint between fork pulley and self-closing fork hook

allowing great freedom of movement. Fork Pulleys are furnished with rope guards, making it impossible for rope to leave the sheave.

SELF-CLOSING FORK HOOK—Special feature with all STAR Carriers. By the use of these hooks a fork may be quickly detached. This hook is much superior to the ordinary method of attaching fork.

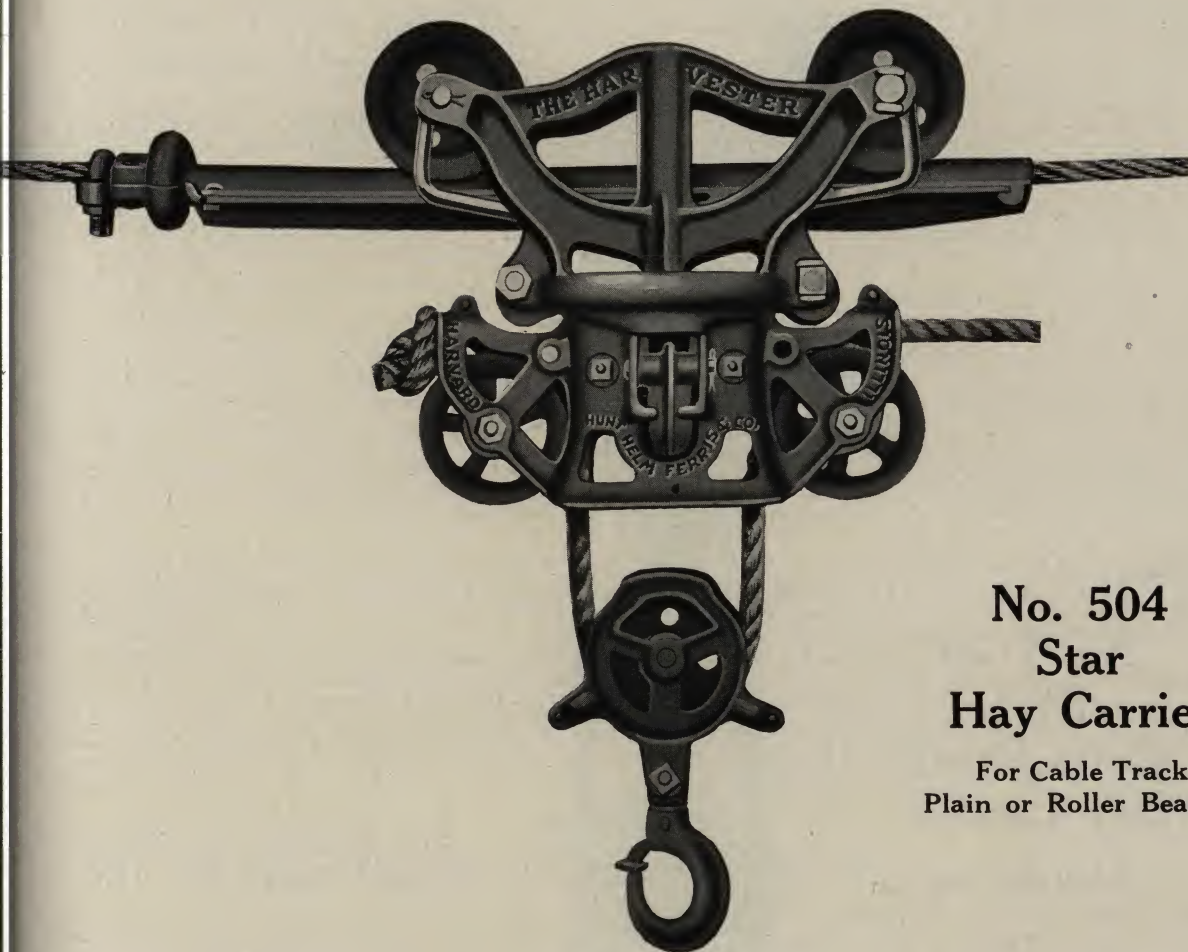
LOCK—Improved type of gravity lock. No springs to rust out or break. This lock embodies the double grapple principle, permitting pulley to enter at any angle and holding it securely. Simple in construction and positive in action.

TRIP BLOCK—Made of best malleable iron of special design, with a depression on the under side bolting over a rivet head on the track, thus making it absolutely impossible to loosen.

ROPE—This Carrier is designed for use with rope and we recommend $\frac{3}{4}$ or $\frac{1}{2}$ -inch manila as being the most serviceable.

FINISH—Aluminum, trimmed in blue.

WEIGHT—36 pounds.



No. 504 Star Hay Carrier

For Cable Track
Plain or Roller Bearing

THE No. 504 STAR Hay Carrier is similar to the Nos. 502 and 503 STAR Hay Carriers, with the exception that the trucks and tracker wheels are especially designed to operate on $\frac{5}{8}$ -inch cable.

The trip block swings loose on the cable and by gravity maintains its position directly under the cable, under all

conditions. It can be located at any desired point or detached without taking down the cable. Like all STAR Hay Carriers, the No. 504 is fitted with gravity locks operating without springs. Strength combined with practicability of design assure uninterrupted service without additional expense of upkeep.

Weight, each, 38 lbs.



**No. 1126
Star
Cross Draft
Hay Carrier**

**Roller Bearing
for STAR Double Flange
Steel Track
or any Standard Steel Track**

Weight, 48 lbs.

**Also furnished for Wood
Track, Specify No. 1128**

THE No. 1126 Star Carrier like other cross draft carriers operates without a trip block, the pull of the draft rope at right angles to the track does away with the lengthwise pull and strain on the track. It locks the load automatically at any desired height, permits the load to be shifted along the track by hand and requires but one man in the mow instead of the usual three men.

It is a full roller bearing carrier, with oscillating legs which assure equal distribution of weight on all four track wheels. The bolt on which the legs turn is threaded. This permits carrier to be widened or narrowed to fit any standard make of track.

This carrier may be tripped by means of the draft rope. The separate rope to trip the car may be used if desired—but it is not needed.

The end of the draft rope is locked to a lever on the under side of the carrier, as shown in the illustration. The weight of the load pulls this lever down and controls the lock. When the team stops pulling on the draft rope, the load is locked at whatever height it happens to be. It can be moved over the mow by use of the shift rope which can be operated by hand.

When the hay is dropped, the lever which controls the lock is relieved of its load and after that a slight pull on the draft rope releases the lock to let down the empty fork or sling.

Cross Draft Carrier in Center Drive Barn

FASTEN pulley K to purlin over center of drive and pulley D to floor near corner. Fasten $\frac{3}{4}$ or $\frac{1}{2}$ in. draft rope to rope hitch on carrier. String other end of rope through sling pulleys up over the carrier sheave and through draft pulleys K and D. Then attach rope hitch Fig. 427 to end of draft rope.

The length of draft rope is three times the height from floor to ridge plus ten or twelve feet.

Place shift pulleys No. 155 at H, J, E, B and M. Tie a shift rope into loop on side of carrier, passing it over pulleys H, J, E and B. Tie another $\frac{5}{8}$ inch shift rope of same length to loop on the opposite side of the carrier, pass it over pulley M and through the second pulley J. Where this second rope reaches the floor with carrier standing at center of driveway attach bag of sand or some other weight. This keeps the unused shift rope straight and automatically draws the carrier back to the center of the barn when the pull on the shift rope is released.

To find length of shift rope follow dotted lines on the illustration from carrier to pulley H through J, E and B. The distance B to E should be half the length of carrier track.

OPERATION—Drive out until the load is raised the desired height. When team stops the rope slackens and carrier locks the load suspended. Hook shift rope hitch Fig. 428 into one of the loops in hook C (Fig. 427) and drive back toward the barn until the load is shifted to proper place in the mow. Then trip the sling and discharge the load.

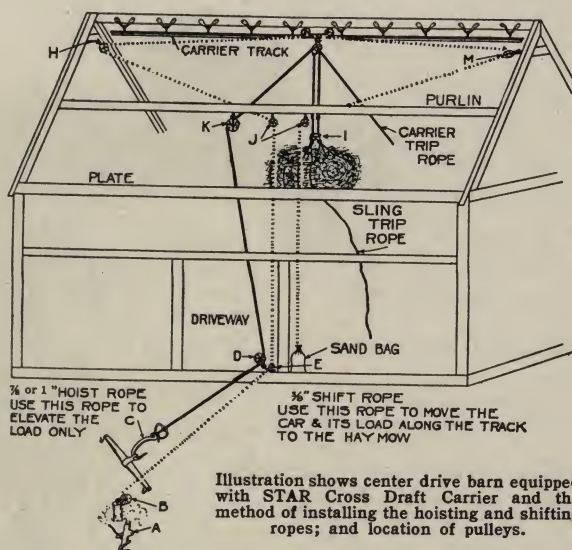


Illustration shows center drive barn equipped with STAR Cross Draft Carrier and the method of installing the hoisting and shifting ropes; and location of pulleys.

Unhook rope hitch Fig. 428 and the carrier will return automatically to the center of the barn by the weight pulling on the other shift rope. A pull on the draft rope after the slings are unloaded releases the rope grip and lets the slings down.

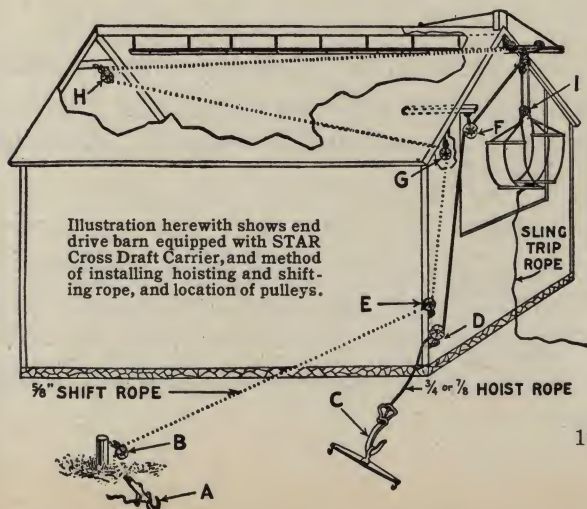
To unload hay in opposite mow detach the rope hitch A and unstring shift rope from pulleys B and E. Re-string pulleys B and E with the other shift rope and attach the rope hitch to the end of it. Now fasten weight or sand bag to the rope which has just been unstrung and proceed as above.

Cross Draft Carrier in End Drive Barn

HANG track as usual with end projecting at least 3 in. beyond building. Fasten 4x6 so it projects about 18 inches from building and hang pulley from hook as shown at F.

Place another pulley at the corner of the barn as low as possible at D.

Fasten end of rope in rope hitch on carrier. String other end of rope through sling pulleys I, over the large sheave in the carrier and then through pulleys F and D.



Tie end of rope to rope hitch Fig. 427 which comes with carrier. Rope required is twice the distance from carrier to ground plus distance from carrier to D through F with ten or twelve feet added unless the barn is more than twice as long as it is high.

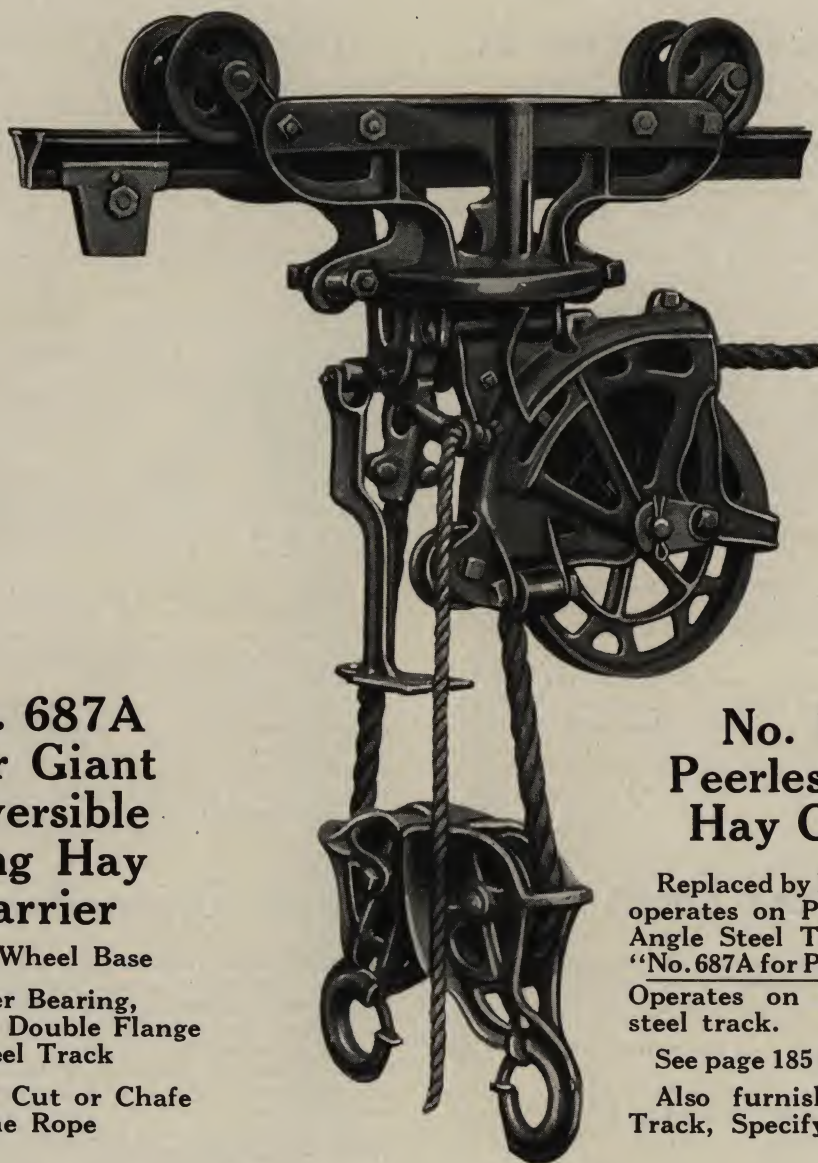
For barns more than twice as long as they are high add the distance from H to D through F and add ten or twelve feet.

The $\frac{5}{8}$ inch shift rope is attached to ring in the side of the carrier truck and strung as shown by dotted line in the lower diagram through pulleys H, G, E and B. Use pulley 155. It is made especially for $\frac{5}{8}$ inch rope. Cut a small hole in the end of barn at G for rope to pass through.

Pulley B should be placed out far enough so that the distance E to B is the same as from the carrier to H.

Length of trip rope is from carrier through H, G and E to B plus ten or twelve feet.

OPERATION—Raise the load to desired height. Any slack on the draft rope locks load suspended. Hook rope hitch Fig. 428 into loop B on rope hitch Fig. 427 and drive back toward barn. This will shift the load along the track. When carrier reaches proper place in the mow pull trip rope attached to Fig. 428 hitch. This releases the shift rope from the team and carrier stops on the track. When the load is discharged from the slings and the carrier returns to the starting point, a pull on the draft rope will automatically release the lock and allow the slings to descend.



No. 687A Star Giant Reversible Sling Hay Carrier

Long Wheel Base

Roller Bearing,
for STAR Double Flange
Steel Track

Will Not Cut or Chafe
the Rope

No. 1130 Peerless Sling Hay Carrier

Replaced by No. 687A which
operates on Peerless Double
Angle Steel Track. Specify
"No. 687A for Peerless Track."
Operates on any standard
steel track.

See page 185 for trip blocks.

Also furnished for Wood
Track, Specify No. 688.

THE No. 687A STAR Giant Sling Hay Carrier, as the name implies, is extra heavy and designed for extra service.

It is not necessary, unless desirable, to elevate the load to the carrier. A down pull on the trip rope illustrated, releases the carrier from the trip block and allows the load to be taken into

the mow at any height. This carrier is equipped with an extra duty 4-wheel truck of sufficient strength to handle any load.

Note especially that this carrier is so designed that the load at all times is directly centered under the track so that it is equally distributed, each tracker wheel carrying its share of the weight.

The 9½-inch roller bearing rope sheave guarantees ease of operation without wear on the rope. The rope grip is designed to effectively hold the load without allowing the rope to either slip or chafe.

The design of this carrier provides not only for an even distribution of the load, but extra strength as well as extra service.

SPECIFICATIONS

NAME—STAR Giant Sling Hay Carrier No. 687A. So named because it is extra heavy and extra strong, designed for heavy work.

STYLE—Sling Carrier for STAR Double Flange Steel Track. It is also made for wood track. Specify No. 688 for wood track.

FRAME—Best grade malleable iron, fully reinforced. Extra heavy and large so as to distribute the load over a greater proportion of the track.

WHEEL BASE—17½ inches from center to center of tracker wheels.

TRACKER WHEELS—Gray iron. Three inches in diameter. Wide flange.

AXLE—Lathe-turned steel axle, made by automatic machinery.

SHEAVE—9½ inches in diameter. Best gray iron.

SHEAVE BEARINGS—The large rope sheave turns on six special, extra long roller bearings contained in a housing.

SLING PULLEYS—The sling pulleys provided with this carrier are STAR Long Neck Pulleys. These pulleys are made with a malleable frame of

improved design, provided with automatic self-closing hook. The sling or fork snaps into this hook and can easily be detached, but it cannot possibly be removed by accident. The hooks are large enough to be used in connection with any style or make of rope or slings or any style of fork. A wide throat with rounded edges prevents wear on the rope.

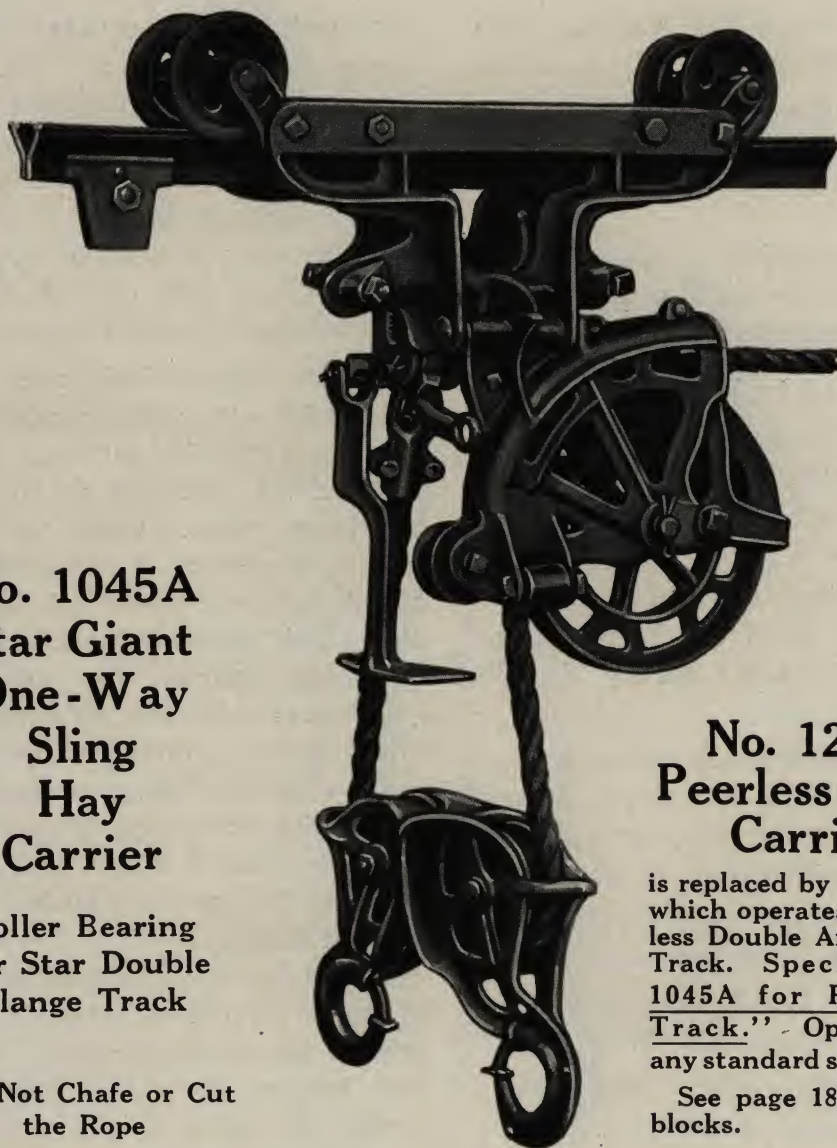
ROPE GRIP—This carrier is provided with a rope gripping device which has a long gripping surface. This gripping surface conforms to the circle of the large wheel. When the hoisting rope is slackened the gripping surface travels with the wheel and sets gradually. This does not mean that the rope slips through the grip, but the grip travels with the rope and clamps firmly at the point where it first takes hold, without chafing or wearing the rope. The extra long gripping surface naturally insures a firm and safe purchase on the rope and holds it securely without chafing.

The trip rope attached to the lever as shown in the illustration locks the grip on the draft rope and at the same time releases the carrier from the trip block. By using this trip rope it is not necessary to raise the load to the carrier as it can be taken into the barn at any desired height.

ROPE—¾-inch, 7⁄8-inch or 1-inch rope may be used. 7⁄8-inch pure manila rope recommended for best results.

FINISH—Aluminum, trimmed in red.

WEIGHT—No. 687A Giant Sling Hay Carrier, each 64 lbs.



**No. 1045A
Star Giant
One-Way
Sling
Hay
Carrier**

**Roller Bearing
For Star Double
Flange Track**

**Will Not Chafe or Cut
the Rope**

CAN be used like any other sling carrier—releasing from the trip block when the rising load strikes the trip foot on the carrier. Can also be tripped and released from the trip block at any time by jerk on the trip rope which hangs at the side of the carrier. This permits load to be carried into mow at any height.

Rope grip has long gripping surface and conforms to the shape of the wheel.

**No. 1299
Peerless Sling
Carrier**

is replaced by No. 1045A which operates on Peerless Double Angle Steel Track. Specify "No. 1045A for Peerless Track." - Operates on any standard steel track.

See page 185 for trip blocks.

Travels with the rope and clamps firmly at the place where it first takes hold. Holds securely without chafing or wearing rope.

Hoisting wheel so located that weight of the load is suspended from the exact center of the carrier and is equally distributed on all four tracker wheels.

Heavy ribs on carrier legs prevent wheels from spreading or getting out of line.

The 9½-inch roller bearing rope sheave guarantees ease of operation without wear on the rope. The rope grip is designed to effectively hold the load without allowing the rope to either slip or chafe.

The design of this carrier provides not only for an even distribution of the load, but extra strength as well as extra service.

SPECIFICATIONS

NAME—STAR Giant One-Way Sling Hay Carrier No. 1045A. So named because it is extra heavy and extra strong, designed for heavy work.

STYLE—Sling Carrier for STAR Double Flange Steel Track.

FRAME—Best grade malleable iron, fully reinforced. Extra heavy and large so as to distribute the load over a greater proportion of the track.

WHEEL BASE—17½ inches from center to center of tracker wheels.

TRACKER WHEELS—Gray iron. Three inches in diameter. Wide flange.

AXLE—Lathe-turned steel axle, made by automatic machinery

SHEAVE—9½ inches in diameter. Best gray iron.

SHEAVE BEARINGS—The large rope sheave turns on six special, extra long roller bearings contained in a housing.

SLING PULLEYS—The sling pulleys provided with this carrier are STAR Long Neck Pulleys. These pulleys are made with a malleable frame of

improved design, provided with automatic self-closing hook. The sling or fork snaps into this hook and can easily be detached, but it cannot possibly be removed by accident. The hooks are large enough to be used in connection with any style or make of rope or slings or any style of fork. A wide throat with rounded edges prevents wear on the rope.

ROPE GRIP—This Carrier is provided with a rope gripping device which has a long gripping surface. This gripping surface conforms to the circle of the large wheel. When the hoisting rope is slackened the gripping surface travels with the wheel and sets gradually. This does not mean that the rope slips through the grip, but the grip travels with the rope and clamps firmly at the point where it first takes hold, without chafing or wearing the rope. The extra long gripping surface naturally insures a firm and safe purchase on the rope and holds it securely without chafing.

The trip rope attached to the lever may be used to lock the grip on the draft rope and at the same time release the carrier from the trip block. By using this trip rope it is not necessary to raise the load to the carrier as it can be taken into the barn at any desired height.

ROPE—¾-inch, 7⁄8-inch or 1-inch rope may be used. 7⁄8-inch pure manila rope recommended for best results.

FINISH—Aluminum, trimmed in red.

WEIGHT—No. 1045A Giant One-Way Sling Hay Carrier, each 55 lbs.

**No. 1212A
Star Giant
Eight-Wheel
Sling
Hay
Carrier**

Roller Bearing

**Will Not Chafe or Cut
the Rope**



**Operates on any stan-
dard steel track.**

**Specify track and trip
block when ordering.**

**See page 185 for trip
blocks.**

CAN be used like any other sling carrier—releasing from the trip block when the rising load strikes the trip foot on the carrier. Can also be tripped and released from the trip block at any time by jerk on the trip rope which hangs at the side of the carrier. This permits load to be carried into mow at any height.

Rope grip has long gripping surface and conforms to the shape of the wheel.

Travels with the rope and clamps firmly at the place where it first takes hold. Holds securely without chafing or wearing rope.

Hoisting wheel so located that weight of the load is suspended from the exact center of the carrier and is equally distributed on all eight tracker wheels.

Heavy ribs on carrier legs prevent wheels from spreading or getting out of line.

The 9½-inch roller-bearing rope sheave guarantees ease of operation without wear on the rope. The rope grip is designed to effectively hold the load without allowing the rope to either slip or chafe.

The design of this carrier provides not only for an even distribution of the load, but extra strength as well as extra service.

SPECIFICATIONS

NAME—STAR Giant Eight-wheel Sling Hay Carrier No. 1212A. So named because it is extra heavy and extra strong, designed for heavy work.

STYLE—Sling Carrier for any style of Steel Track.

FRAME—Best grade malleable iron, fully reinforced. Extra heavy and large so as to distribute the load over a greater proportion of the track.

WHEEL BASE—23½ inches from center to center of tracker wheels.

TRACKER WHEELS—Gray iron. Three inches in diameter. Wide flange.

AXLE—Lathe-turned steel axle, made by automatic machinery.

SHEAVE—9½ inches in diameter. Best gray iron.

SHEAVE BEARINGS—The large rope sheave turns on six special, extra long roller bearings contained in a housing.

SLING PULLEYS—The sling pulleys provided with this carrier are STAR Long Neck Pulleys. These pulleys are made with a malleable frame of

improved design, provided with automatic self-closing hook. The sling or fork snaps into this hook and can easily be detached, but it cannot possibly be removed by accident. The hooks are large enough to be used in connection with any style or make of rope or slings or any style of fork. A wide throat with rounded edges prevents wear on the rope.

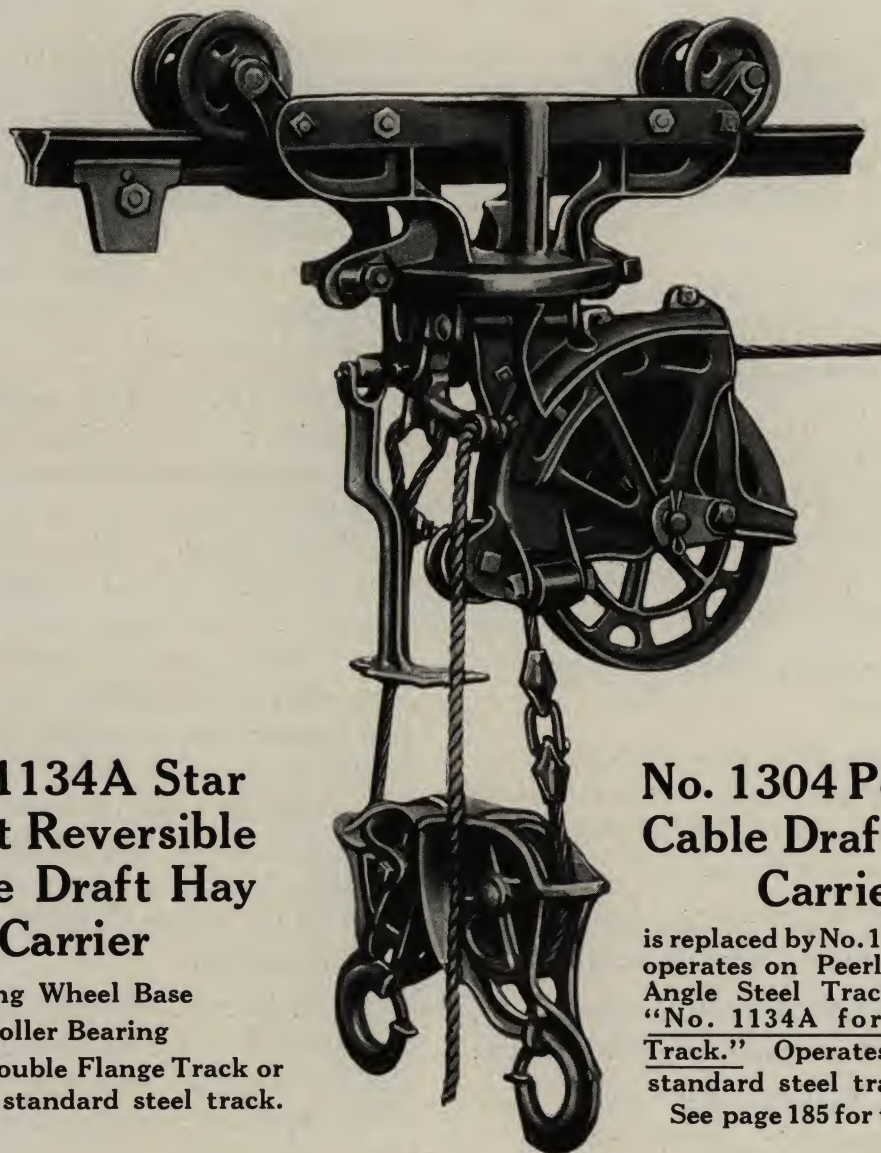
ROPE GRIP—This carrier is provided with a rope gripping device which has a long gripping surface. This gripping surface conforms to the circle of the large wheel. When the hoisting rope is slackened the gripping surface travels with the wheel and sets gradually. This does not mean that the rope slips through the grip, but the grip travels with the rope and clamps firmly at the point where it first takes hold, without chafing or wearing the rope. The extra long gripping surface naturally insures a firm and safe purchase on the rope and holds it securely without chafing.

The trip rope attached to the lever as shown in the illustration locks the grip on the draft rope and at the same time releases the carrier from the trip block. By using this trip rope it is not necessary to raise the load to the carrier as it can be taken into the barn at any desired height.

ROPE—¾-inch, ⅞-inch or 1-inch rope may be used. ⅞-inch pure manila rope recommended for best results.

FINISH—Aluminum, trimmed in red.

WEIGHT—No. 1212A Giant Eight-wheel Sling Hay Carrier, each 68 lbs.



No. 1134A Star Giant Reversible Cable Draft Hay Carrier

**Long Wheel Base
Roller Bearing**
for Star Double Flange Track or
any other standard steel track.

No. 1304 Peerless Cable Draft Sling Carrier

is replaced by No. 1134A which
operates on Peerless Double
Angle Steel Track. Specify
"No. 1134A for Peerless
Track." Operates on any
standard steel track.

See page 185 for trip blocks.

NO. 1134A STAR Giant Cable Draft Sling Carrier is built extra heavy for the heavy work that is usually thrown upon a cable draft carrier.

This carrier is so designed that the load is not only centered directly below the track but hangs exactly below the middle of the carrier truck so that there is an even bearing on all four of the tracker wheels and no tendency to strain the carrier or pull it out of line.

Several years of experimenting with rope grips or locks have indicated that a grip which holds tight enough to prevent the cable slipping through will soon wear out the cable at the point where the grip takes hold repeatedly.

To prevent this wear two malleable fittings on which the rope grip takes hold are included with a short length of cable as illustrated, which accompanies the carrier.

This short length of cable is easily connected with the draft cable by use of the cold shut link illustrated on the following page.

As the nine and one-half-inch roller bearing sheave turns, the gripping device moves forward with it, taking its final grip right where it first took hold of the malleable fitting. This eliminates the sudden jerking which, with heavy loads of hay, would be hard on the cable, hard on the track and hard on the building.

Specifications

NAME—STAR Giant Cable Draft Sling Carrier. So named because it is extra heavy and extra strong, designed for heavy work. Cable Draft Sling Carrier for cable track. Also made for wood track. Specify No. 688 for wood track.

FRAME—Best grade malleable iron pulley, reinforced. Extra heavy to distribute load over greater portion of track.

WHEEL BASE—Seventeen and one-half inches from center to center of tracker wheels.

TRACKER WHEELS—Gray Iron. Three inches in diameter. Wide flange.

AXLE—Lathe turned steel axle.

SHEAVE—Nine and one-half inches in diameter.

SHEAVE BEARINGS—The large rope sheave turns on six special extra long roller bearings contained in a housing.

SLING PULLEYS—The Sling Pulleys provided with this carrier are long neck pulleys. They are made with a heavy malleable frame and provided with automatic self-closing hook. The sling or fork snaps into this hook and can easily be detached but cannot possibly be removed by accident. The hooks are large enough to be used in connection with any style or make of rope or slings or any style of fork. A wide throat with rounded edges prevents wearing on the cable.

CABLE GRIP—The surface of the cable grip conforms to the circle of the large wheel. It travels with the wheel when it starts to take hold of the malleable fittings with which it holds the cable. It takes its final grip at the point where it first takes hold without any slipping or sliding that would cause wear.

A trip rope attached to the lever at the side of the carrier as shown in the illustration makes it possible to release the carrier from the trip block when the load is at any desired height, although this is seldom used with a cable draft carrier.

CABLE—No special cable is required. Standard three-eighths inch cable, which can be purchased anywhere, is used.

Weight, 68 lbs.

Cable Attachments

The illustration at the right shows the cable fittings and connections which are a part of and are supplied with the No. 1134 Cable Draft Carrier.

They consist of a short length of cable which is fastened to the hook at the side of the carrier with the malleable fitting at just the right place so that the cable grip will take hold of it when the sling pulleys strike the tripping arm and release the carrier from the trip block.

The other malleable cable end shown in the illustration is easily applied to the end of the long piece of cable following the complete but very simple directions sent out with the carrier.

By means of the cold shut link the cable end of the long cable is easily connected with the cable end of the short piece that comes with the carrier.

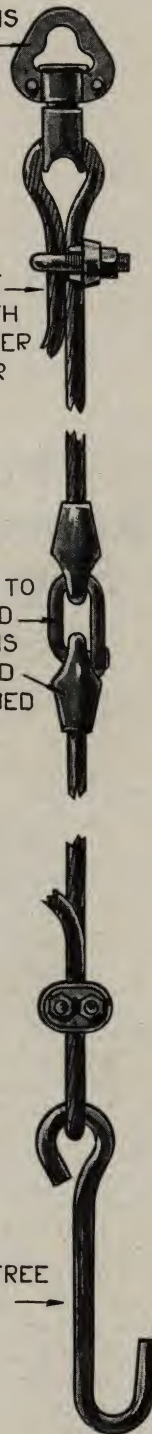
For convenience, the carrier and pulleys are threaded with the short piece of cable before the long draft cable is attached.

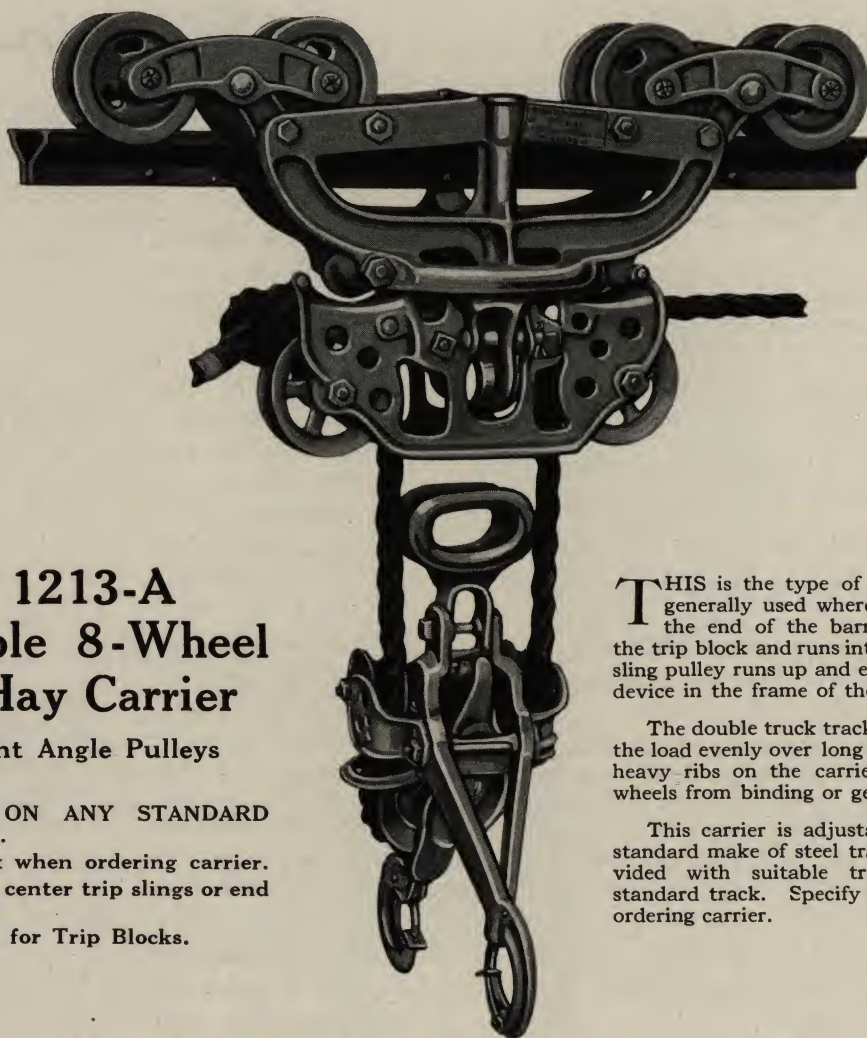
FASTEN THIS LOOP TO HOOK ON SIDE OF CARRIER

THIS PART COMES WITH THE CARRIER READY FOR USE

THIS LINK TO BE RIVETED AFTER THIS CABLE END IS ATTACHED

WHIFFLETREE HOOK





No. 1213-A Reversible 8-Wheel Sling Hay Carrier

With Right Angle Pulleys

OPERATES ON ANY STANDARD
STEEL TRACK.

Specify track when ordering carrier.

For use with center trip slings or end
trip slings.

See Page 185 for Trip Blocks.

THIS is the type of hay carrier that is generally used where hay is taken in at the end of the barn. It releases from the trip block and runs into the barn when the sling pulley runs up and engages the gripping device in the frame of the carrier.

The double truck tracker wheels distribute the load evenly over long length of track and heavy ribs on the carrier legs prevent the wheels from binding or getting out of line.

This carrier is adjustable to run on any standard make of steel track and can be provided with suitable trip block for any standard track. Specify kind of track when ordering carrier.

SPECIFICATIONS

NAME—STAR, Reversible 8-wheel Sling Hay Carrier No. 1213-A.

STYLE—Reversible Sling Carrier for any standard make of steel track.

FRAME—Best grade malleable iron, fully reinforced. Extra heavy and large to distribute the load over a greater portion of track.

WHEEL BASE— $23\frac{1}{2}$ inches from center to center of tracker wheels.

TRACKER WHEELS—Gray iron. Three inches in diameter. Wide flange.

ROPE—This carrier is designed for use with $\frac{3}{4}$ -in. or $\frac{7}{8}$ -in. rope. Manila rope of the $\frac{7}{8}$ -in. size is recommended as the most serviceable.

FINISH—Gray enamel. Trimmed in blue.

WEIGHT—55 lbs.

AXLE—Lathe-turned steel axle. Made by automatic machinery.

SHEAVES—4 inches. Best gray iron sheaves. Revolve on $\frac{5}{8}$ -in. turned axle.

SLING PULLEYS—The sling pulleys provided with the No. 1213-A carrier are standard right angle sling pulleys made with heavy malleable frames and automatic locks. The carrier is regularly furnished with the No. 553 sling pulley shown in the illustration for use with center trip slings.

It can also be furnished with sling pulleys for end trip slings. Where end trip sling pulleys are wanted specify No. 1213-A hay carrier with No. 829 sling pulleys.

LOCK—Improved type of gravity lock. No springs to rust or break. This lock embraces the double grapple principle permitting the pulley to enter at any angle and holding it securely. Simple in construction and positive in action.

TRIP BLOCK—Made of best malleable iron of special design. The trip block furnished to use Star double flange bolts over a rivet head on the track makes it absolutely impossible to loosen. Trip blocks for use with this carrier on other makes of track are attached in the same manner in which trip blocks are always attached to rigid track.

No. 142 Star Double Flange Steel Hay Carrier Track



SPECIFICATIONS

WE can prove the superiority of STAR over any hay carrier track on the market, irrespective of make or price. Read the specifications carefully.

MATERIAL—STAR Double Flange Steel Hay Carrier Track is made of high carbon steel of the same grade used in the manufacture of railroad rails.

STRENGTH—The strength of any track is in its thickness rather than in its width. It

Track able to sustain nearly twice as heavy a load as any other hay carrier track manufactured.

HANGERS—STAR Track Hangers slide lengthwise of track, thus adjusting to any rafter bracket.

TRIP BLOCK—All Trip Blocks used with STAR Double Flange Hay Carrier Track fit over the head of a rivet in the track. They cannot possibly jar loose or slide.

CONSTRUCTION—STAR Double Flange

The illustration shows a section of our STAR Double Flange Steel Hay Carrier Track. Width of track, 2 in.; depth, 2 in. Made in 6 and 10-foot lengths. Wt. per ft., 2 lbs.

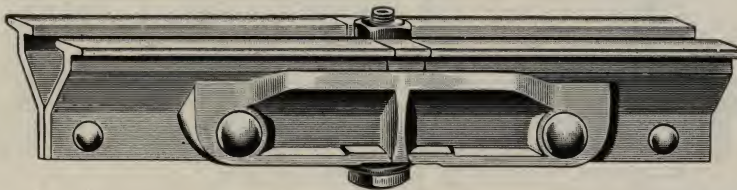


Fig. 142

is a well known fact that any material set on edge will support a heavier load without bending than if laid flat. On this principle we constructed STAR Double Flange Steel Hay Carrier Track. It is guaranteed to be as strong at the splice as at any other place. By actual test we have found STAR Double Flange Steel Hay Carrier

Steel Hay Carrier Track is as simple in construction as it is strong and durable. It is really two tracks in one—the two special rolled steel bars being securely joined with rivets. These rivets are only eight inches apart, which makes the track rigid, therefore it will not bend, buckle, twist or spring.

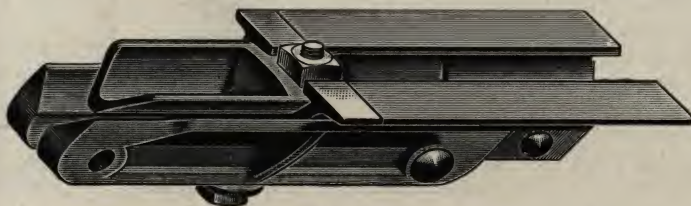


Fig 143.

SPLICE—In figure 143 we show plainly the construction of a splice consisting of three pieces of malleable iron, one section inside of track and two sections outside, and so locked that they cannot become loosened.



Star Double Flange Steel Hay Carrier Track Fixtures

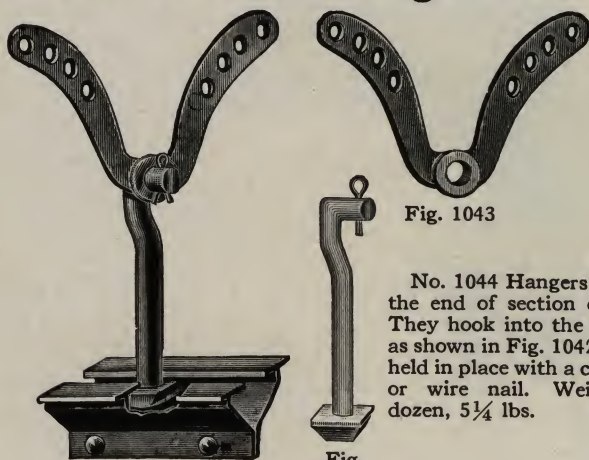


Fig. 1043

No. 1044 Hangers slip into the end of section of track. They hook into the brackets as shown in Fig. 1042 and are held in place with a cotter pin or wire nail. Weight per dozen, $5\frac{1}{4}$ lbs.

Fig. 1044

Fig. 1042

Adjustable Track Fixtures

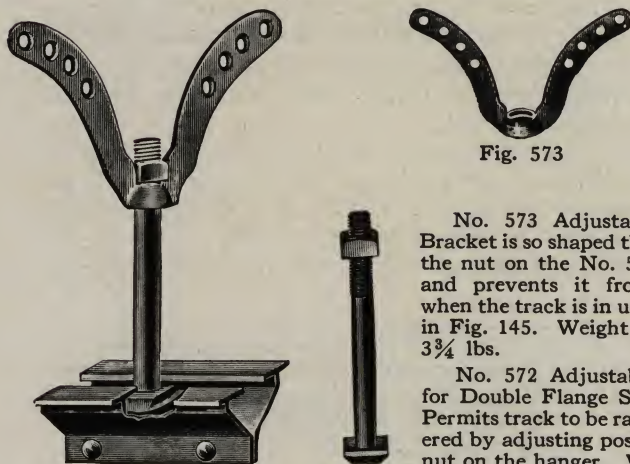


Fig. 573

No. 573 Adjustable Rafter Bracket is so shaped that it holds the nut on the No. 572 Hanger and prevents it from turning when the track is in use as shown in Fig. 145. Weight per dozen, $3\frac{3}{4}$ lbs.

No. 572 Adjustable Hanger for Double Flange Steel Track. Permits track to be raised or lowered by adjusting position of the nut on the hanger. Weight, per dozen, $5\frac{1}{4}$ lbs.

Fig. 572

Fig. 145

Track End Stop Block

Two, No. 870 End Stops are furnished with each carrier, one for each end of track.

They are used as shown in the illustration at the left. Both should be pushed up snug against a 2x4 or 2x6 cleat bolted to the rafters. This prevents track from working endwise and keeps carrier from running off the end of the track.

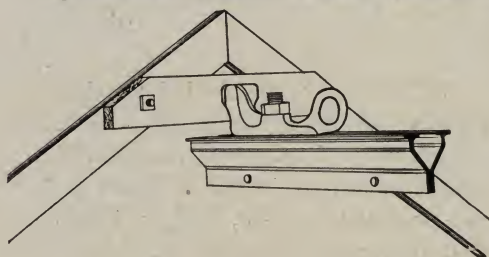


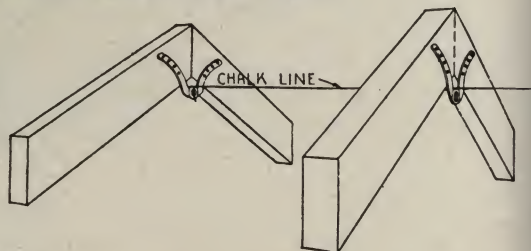
Fig. 870

Carrier can easily be taken off when necessary by unbolting the cleat and stops.

New STAR Track Fixtures

No. 1043 Rafter Bracket is used with No. 1044 Track Hanger as shown in Fig. 1042.

This combination eliminates more than half the work of installing hay carrier track. All the brackets are nailed into place being nailed up by a chalk line stretched from one end of the barn to the other as shown in illustration below. Weight per dozen, $3\frac{3}{4}$ lbs.



No. 904 Gothic Roof Hanger

Attach to ridge-pole of Gothic Roof so track will clear the roof trusses.

No. 1073 Outside Track Hanger

No. 1073 Outside Track Hanger is used to support STAR Double Flange Steel Track at the end of the barn. Weight per dozen, 11 lbs.

No. 767 Outside Track Hanger

Used to support hay carrier track at end of the barn. The top bolt is 14 inches long and can be adjusted to ridge-pole of any depth. Weight per dozen, 12 lbs.

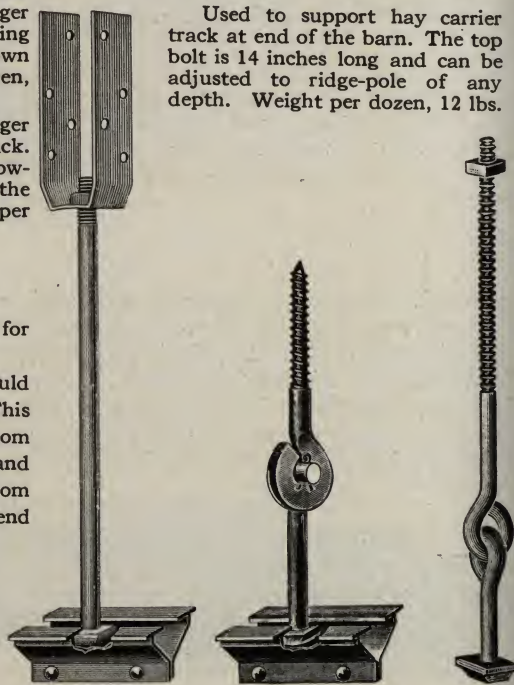


Fig. 904

Fig. 1073

Fig. 767

No. 581 Peerless Double Angle Steel Hay Carrier Track

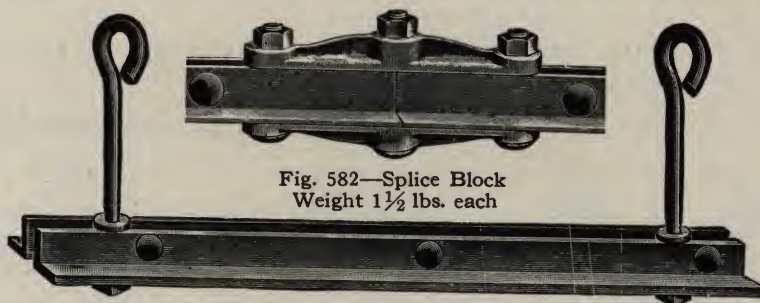


Fig. 582—Splice Block
Weight $1\frac{1}{2}$ lbs. each

Fig. 581

The above illustration shows a section of Peerless Double Angle Steel Hay Carrier Track, furnished in 6 and 12 foot lengths, including splices. Width of track $2\frac{1}{2}$ in. Weight 2 lbs. per ft. Hangers shown are the No. 584 hangers used with No. 126 rafter brackets or No. 87 ridge pole bracket shown on the next page.

PEEERLESS Double Angle Steel Hay Carrier Track is built of exactly the same material as is used in the construction of railroad rails. The two inch by inch steel angles, separated by iron spacers, are riveted firmly together.

Fig. 581 shows a section of Peerless Double Angle Steel Track. The heavy rivets holding the two angles together forming this track, are spaced 12 inches apart so that it is impossible for the track to bend, buckle or get out of line.

Fig. 582 shows the splice block by which the sections of Peerless Double Angle Steel Hay Carrier Track are joined. Each Splice Block consists of two sections of malleable iron held together by three heavy bolts. We guarantee this track to be as strong at the splice as at any other point. Sufficient splices for a complete installation are furnished with the track.

The construction of the track permits the hangers to be spaced to conform to the arrangement of the rafters, regardless of the distance apart.

Peerless Double Angle Hay Carrier Track Fixtures

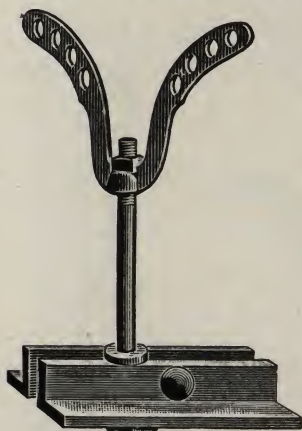


Fig. 585

ADJUSTABLE HANGER
and RAFTER BRACKET

By use of the adjustable hanger and rafter bracket as shown in Figure 585 track can be accurately leveled though the rafters may be uneven as in old barn. This is done after track is put up by turning a nut on the top of the hanger. Square seat in the center of the bracket locks the nut and prevents hanger working loose.



Fig. 573

ADJUSTABLE
RAFTER BRACKET
Weight per doz. $3\frac{3}{4}$ lbs.



Fig. 1043

RAFTER BRACKET
Weight per doz. $3\frac{3}{4}$ lbs.

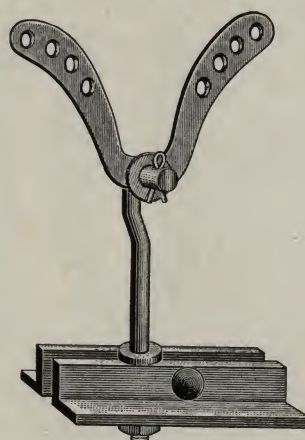


Fig. 1173

RAFTER BRACKET

No. 1043 Rafter Brackets are located with a chalk line stretched from end to end of the barn.

No. 1172 Hanger is hooked into the No. 1043 bracket and held in place with a cotter pin or nail as shown above.



Fig. 588

ADJUSTABLE
TRACK HANGER
Weight per doz. $5\frac{3}{4}$ lbs.



Fig. 1172

TRACK HANGER
Weight per doz. 6 lbs.



Wood Track Hangers and Other Fixtures

WOOD TRACK HANGER AND RAFTER BRACKET

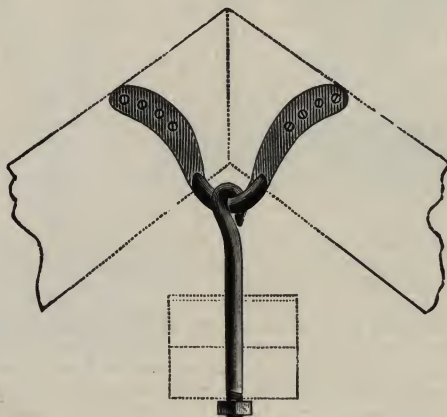


Fig. 79

By the use of this Hanger the track is hung directly in the center of the peak and has the full strength of both rafters.

RIDGE-POLE BRACKETS

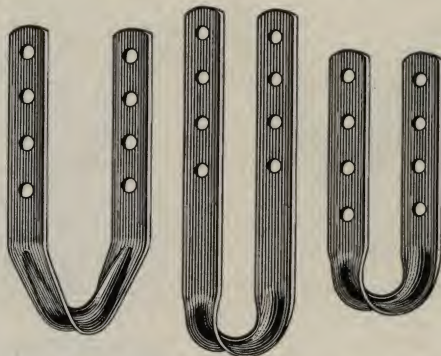


Fig. 1209

Fig. 1218

Fig. 87

Made of the best pressed steel, of proper size to be used on ridge-pole 4 x 4, 2 x 8 or 2 x 6. By driving a nail in each slot it is made secure enough to hold any track. Weight, per doz., 5½ lbs.

FLOOR HOOK



Fig. 85

No. 85 —Weight, 5/8 x 6 in. hook, per doz., 10 lbs.
No. 85A—Weight, 3/4 x 8 in. hook, per doz., 12½ lbs.

JOINTED TRACK HANGER

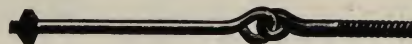


Fig. 83

Weight, per doz., 12 lbs.

TRACK HANGER HOOK

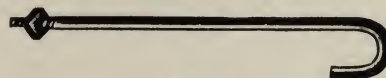


Fig. 84

Made in three sizes:

Weight, per doz., 12-in., 9¾ lbs.

Weight, per doz., 14-in., 10¾ lbs.

WOOD TRACK HANGER

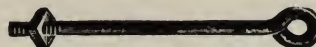


Fig. 131

10-inch

Weight, per doz., 9 lbs.

RAFTER BRACKET AND HANGER



Fig. 126



Fig. 148

Weight, per doz., 3¾ lbs.

Weight, per doz., 3 lbs.

SWIVEL ROPE HITCH AND HOOK



Fig. 86

One of the most handy and useful articles in a hay tool outfit. No hard knots to untie, no wasting of rope by cutting knots open. Twist in the rope is removed by the swivel.

Weight, per doz., 16 lbs.

Hay Slings

O. K. Center Trip Slings



Fig. 954
Center Trip
Sling Lock



Fig. 955
Open View of
Sling Lock
No. 954

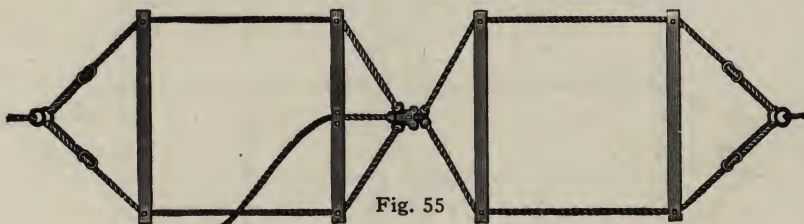


Fig. 55

Fig. 55 represents our O. K. Center Trip Sling, with 4-foot cross bars.

The ropes are $\frac{1}{2}$ -inch loose lay, are strong and will not gnarl or kink. They have an adjustable take-up at either end so that they can be shortened or lengthened to suit the length of the hayrack.

The cross bars are heavy and strong, made of hardwood, in 4-foot lengths.

Weight, No. 55 Sling, 4-foot bars, 18 lbs.

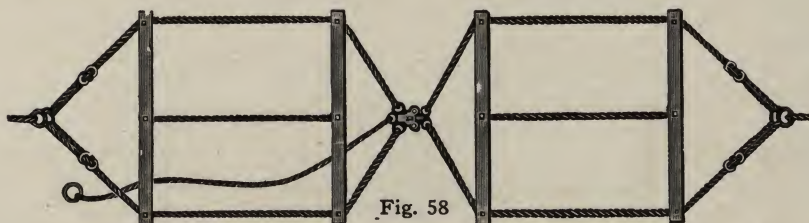


Fig. 58

Above we illustrate our O. K. Center Trip Sling, 5-foot bars, 3 ropes. This is the same style sling as shown in Fig. 55 with the exception of an extra rope running lengthwise.

Weight, No. 58 Sling, 23 lbs.

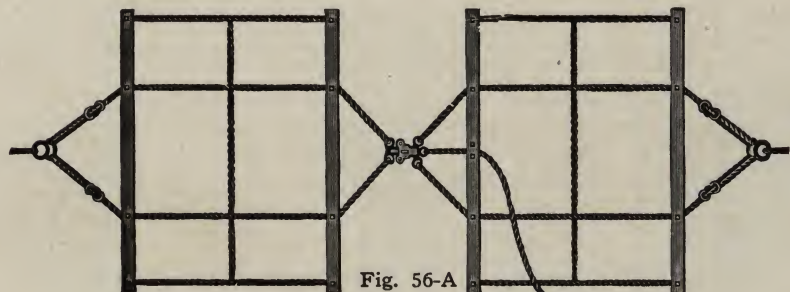


Fig. 56-A

The Harvard Center Trip Sling is extra strong in every respect. It is made for heavy work. As this sling is specially roped, it forms a bed or net sufficiently close to carry fine hay or grain satisfactorily, no matter how short or dry. It is furnished with 6-foot bars.

Weight, 6-foot sling, Fig. 56A, each, 33 lbs.



No. 549M
2 Manila
Rope Sling.

Made with two $\frac{1}{2}$ -inch loose lay ropes that will not gnarl nor kink.

Adjusts to 19 ft. 9 in. long.

Weight each, 4 lbs.



No. 549AM

This is the same handy Junior Rope Sling as the No. 549M excepting that it is furnished with three instead of two ropes.

Adjusts to 19 ft. 9 in. long.

Weight each, 5 lbs.

Hay Slings

HARVARD DOUBLE LOCK CENTER TRIP SLING

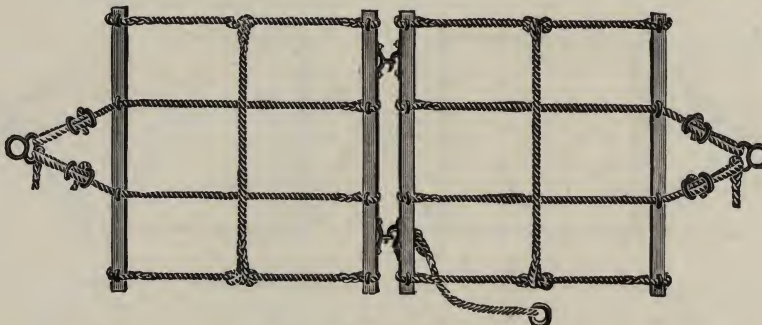


Fig. 769

The Harvard Double Lock Center Trip Sling, illustrated above, is adapted for handling hay, fodder, or large bundles of grain. Two sets of locks are used to join the two halves of the sling instead of one. This double lock device makes two separate connections—a hook and eye being used at one end of the bars and a lock at the other. This double connection makes the sling

especially strong at the point of greatest strain and balances the load at the same time. This sling is connected and locks with the same motion and can be instantly shortened or lengthened to fit the hay rack. It is a very popular sling because of the constantly increasing demand for a sling to carry large and very heavy loads. Six feet wide. Weight, each, 36 lbs.

STAR DOUBLE LOCK CHAIN SLINGS

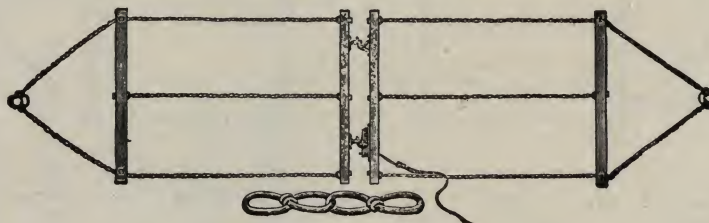


Fig. 1147

Made for handling hay or bundles of grain and fodder from the wagon.

This new design has two connections between the two halves of the sling, instead of the one center lock as generally used, and is made of No. 00 Brown Chain, gal-

vanized. The double lock device construction is such that the hook and eye are used at one end of the sling and a lock at the other end, making two separate connections. This adds great strength and causes the load to be carried without sides drooping. It is connected and locked with one motion. Five feet wide. Weight, 29 lbs.

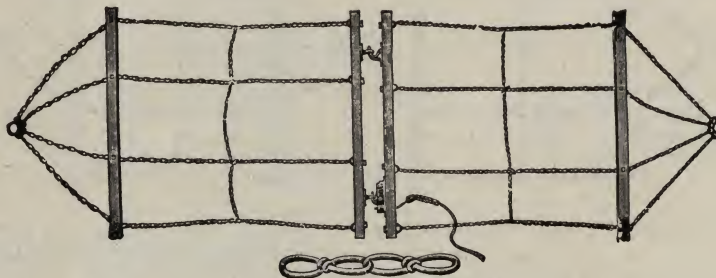


Fig. 1148

The No. 1148 Double Lock Chain Sling is one of increasing popularity for it will carry the extra large loads

—more work in less time. Six feet wide Weight, 40½ lbs. This sling is connected and locks with the same motion.



No. 553
Harvester Sling Pulley for
use with Center Trip
Slings

Harvester Sling Pulleys

HARVESTER Sling Pulleys can be used with any style or make of Fork Carrier provided they are equipped with the proper registering heads.

No. 553 Harvester Sling Pulley is for use with Center Trip Slings only.

No. 829 Harvester Sling Pulley is for use with End Trip Slings only.

Specify carefully which pulley is wanted. Weight, each, 13 lbs.

END TRIP SLING LOCKS

Fig. 552 illustrates the Single Hook Sling Lock provided with one large hook only, into which the braided loops at the end of the rope sling may be hooked.

This style of lock is especially desirable for use with home made slings.

Fig. 552, Single Hook Sling Lock, weight, each, 2 lbs.

Fig. 551, Double Hook Sling Lock (not illustrated), weight, each, 2 lbs.

Fig. 591 Triple Hook Sling Lock, weight, each 2 lbs.

Harvester Long Neck Pulleys with 6½ in. sheaves, per set, weight, 15 lbs.

Harvester Long Neck Pulleys with 4 in. Sheaves, per set, weight, 11 lbs.

Note: Be sure to specify size of sheave wanted.

By use of the Harvester Fork Clevis illustrated in Fig. 578, any style of fork may be used with either parallel or right angle sling pulleys of any make. It is sometimes desirable to take off the greater part of the load with a fork and then to use a single sling for the remaining part as the sling takes up the hay cleaner than the fork.

This Fork Clevis is fitted with a swiveling sister hook to which any style of fork can be attached and made secure.

Hay Fork Clevis, Fig. 578, weight, each, 3½ lbs.

Fig. 824 illustrates Sling Pulleys especially adapted for use with End Trip Slings. The Sling Pulleys regularly furnished with Sling Carriers are adapted for use with Center Trip Slings.

Sling Pulleys, Fig. 824, for use with End Trip Slings, per set, weight, 14 lbs.



No. 829
Harvester Sling Pulley for
use with End Trip
Slings



Fig. 591
Triple Hook Sling Lock



Fig. 552
Single Hook Sling Lock

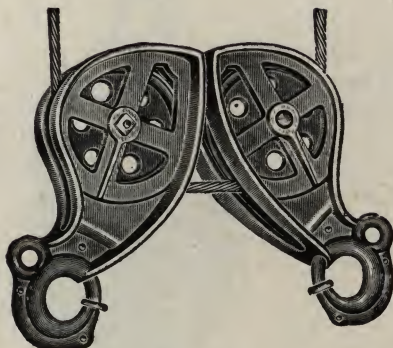


Fig. 641
Harvester Long Neck Cable Pulleys

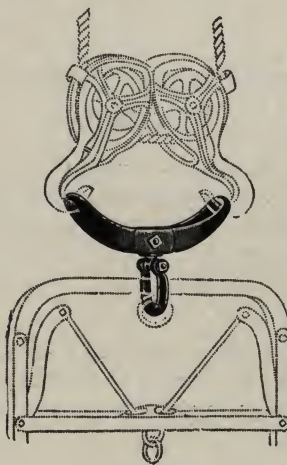


Fig. 578
Harvester Fork Clevis



Fig. 824
Sling Pulleys for Use with End
Trip Slings

Hay Fork Pulleys

MALLEABLE FRAME KNOT-PASSING PULLEYS

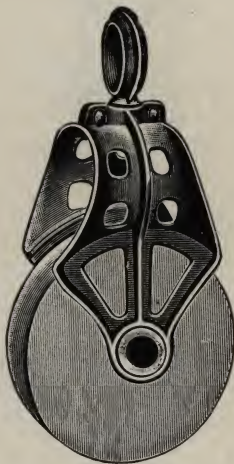


Fig. 103

Fig. 103 represents our special design Malleable Frame Knot-passing Pulley. It has 6-inch sheave, which revolves on large hollow pin; sheave is made of hard maple. The frame is made of the best malleable iron with malleable swivel eye.

Gray enamel finish. Weight, each, 3 lbs.

Fig. 103G same as above with gray iron frame. Finished in black.

Fig. 104 shows the same frame with 6-inch cast iron sheave. The sheaves are interchangeable. These pulleys are warranted to give satisfaction.

Gray enamel finish. Weight, each, $3\frac{1}{2}$ lbs.

Fig. 104G same as above with gray iron frame. Finished in black.



Fig. 104

Fig. 108½ represents our plain steel frame pulley. The frame is of heavy wrought steel with malleable swivel eye. The sheave is of cast iron 5½ inches in diameter.

Gray enamel finish. Weight, each, $2\frac{3}{4}$ lbs.



Fig. 108½

ALL IRON PULLEY

Fig. 109 represents our All Iron Pulley. It has cast iron frame, with cast iron sheave 5½ inches in diameter. Frame has heavy rib to increase the strength. The sheave revolves on large hollow pin. Has swivel eye.

Weight, each, $3\frac{1}{2}$ lbs. Finished in black.

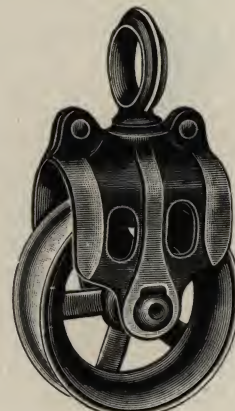


Fig. 109

WOOD FRAME PULLEYS

Reed Pattern

Fig. 111 illustrates our Wood Frame Pulley, with wrought steel yoke and malleable swivel eye. The frame and 5-inch sheave are hard maple. The sheave revolves on a large bushing.

Weight, each, 3 lbs.

Fig. 112 represents the same construction, except that a swivel hook is used in place of the malleable eye.

Weight, each, 3 lbs.

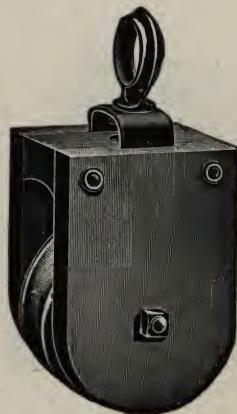


Fig. 111

Fig. 1200 Wood Frame Pulley is the same as No. 111 except that it is larger—with 8-inch sheave.



Fig. 112

Hay Fork Pulleys

FLOOR PULLEY

Fig. 110 illustrates our Floor Pulley. The frame thoroughly protects the sheave. The sheave is made of hard maple. It has a hollow pin and swivel eye.

Gray enamel finish. Weight, each, $2\frac{1}{2}$ lbs.



Fig. 110

MALLEABLE FRAME PULLEY

Hollow Pin

Fig. 127 illustrates our new Malleable Frame Hollow Pin Pulley. Frame constructed to prevent chafing of rope. Malleable swivel eye, 6-inch hard maple sheave. Gray enamel finish. Weight, dozen, 36 lbs.

Fig. 127G same as above with gray iron frame. Finished in black.



Fig. 127

MALLEABLE FRAME PULLEY

Knot-Passing

Fig. 48 illustrates our new Malleable Frame Knot-Passing Pulley, with large hollow pin. It has a hard maple sheave, 6 inches in diameter. Frame is made of malleable iron, extra strong and heavy. Has malleable swivel eye. Frame constructed to prevent chafing of rope. Gray enamel finish. Weight, each, $3\frac{1}{2}$ lbs.

Fig. 48G same as above with gray iron frame. Finished in black.

Fig. 80 Pulley. Is the same as Fig. 48, except that it has 7-inch sheave. Weight, per dozen, 62 lbs.

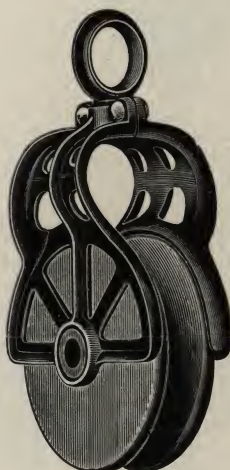


Fig. 48

STEEL FRAME CABLE PULLEY

Fig. 43 represents our Steel Frame Cable Pulley which is fitted with 7-inch iron sheave adapted for $\frac{3}{8}$ or $\frac{1}{2}$ -inch cable. Frame made of high carbon steel. We use half-inch gas pipe to hold sheave in place, making an extra strong pulley. We also furnish this pulley of the same construction but fitted with roller-bearing sheave.

Weight, Steel Frame, Fig. 43, each, $6\frac{1}{4}$ lbs.



Fig. 43

SISTER HOOK AND CLAMP

Fig. 703 shows Sister Hook and Clamp, which offers a very convenient method of hanging a pulley at the end of the track.

This fixture includes a universal joint between the sister hook and clamp, allowing great flexibility and freedom of movement.

The Sister Hooks are constructed of two mated malleable hooks which swivel on a steel bolt. They hold the pulley securely without danger of its being detached by accident, but when desired the pulley may be readily detached.

Weight $2\frac{1}{4}$ lbs. each.



Fig. 703

SHIFT ROPE PULLEY

Fig. 155 is a malleable frame pulley designed especially to use with shift rope in connection with Cross Draft Carriers.

Weight, Fig. 155 Pulley, each, $2\frac{3}{4}$ lbs.

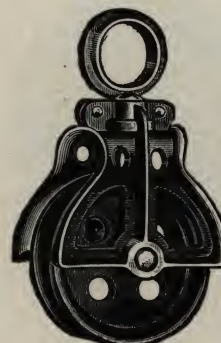


Fig. 155

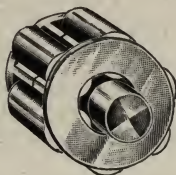


Stowell Anti-friction Hay Fork Pulleys

Here you see illustrated our new Malleable Iron Anti-friction Hay Fork Pulleys, with malleable iron cage for pulleys. These are the well-known Stowell Hay Fork Pulleys which we are now manufacturing and offering to the trade. Their sturdy construction insures against all breakage. The two shown directly below have sheaves 5-inches in diameter, with japanned finish.



No. 1 and No. 10
(No. 885 and No. 887)
Swivel Ring



ROLLER BUSHING OF HAY FORK PULLEYS

Each roller in a separate runway.

No. 1 (No. 885) Malleable Frame with 5-in. roller bearing rope sheave with eye. 6 lbs. each.

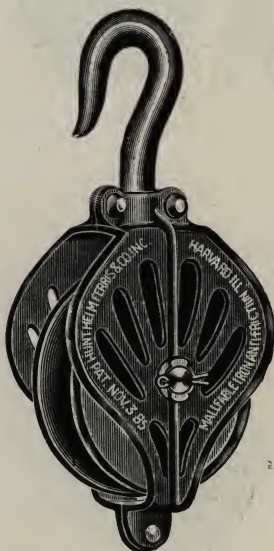
No. 3 (No. 886) Malleable Frame with 5-in. roller bearing rope sheave with hook. 6 lbs. each.

No. 10 (No. 887) Malleable Frame with 5-in. roller bearing cable sheave with eye. 5½ lbs. each.

No. 11 (No. 888) Malleable Frame with 5-in. roller bearing cable sheave with hook. 6 lbs. each.



No. 3 and No. 11
(No. 886 and No. 888)
Swivel Hook



No. 13 (No. 903) Hook

The Nos. 12 and 13 Hay Fork Pulleys are also of the anti-friction type for Wire Cable. These two will now answer the needs for a larger pulley, made in two designs as listed below:

No. 12 (No. 902) Malleable Frame with 8-in. roller bearing cable sheave with eye. 10 lbs. each.

No. 13 (No. 903) Malleable Frame with 8-in. roller bearing cable sheave with hook. 10½ lbs. each.



No. 12 (No. 902) Ring

Hay Forks

Nellis Hay Fork



Fig. 94
Weight, 11 lbs.

Short Head Double Harpoon Fork

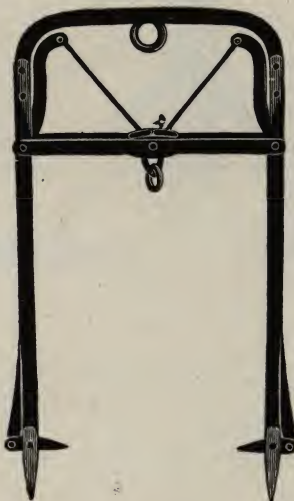


Fig. 95
Made of steel. Length of tines under cross-bar, 25 in. Weight, 17 lbs.

Extra Long Double Harpoon Fork

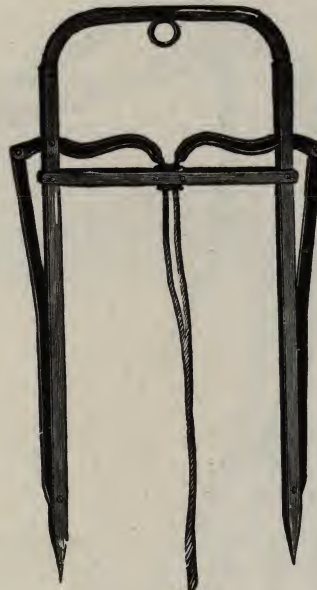


Fig. 97
Made of steel. Length of tines under the cross-bar, 31 inches. Weight, 20 lbs.

Lock-Lever Double Harpoon Fork

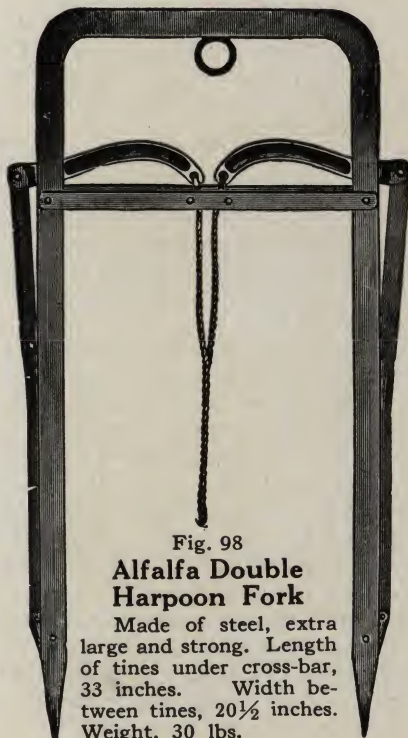


Fig. 98
Alfalfa Double Harpoon Fork

Made of steel, extra large and strong. Length of tines under cross-bar, 33 inches. Width between tines, 20½ inches. Weight, 30 lbs.

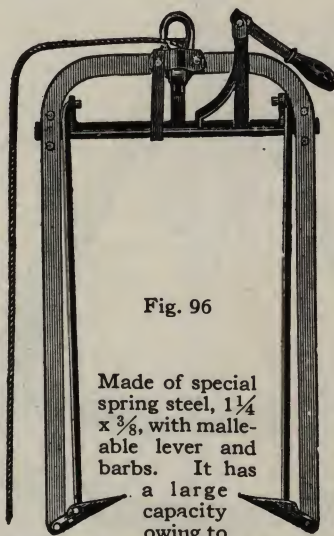


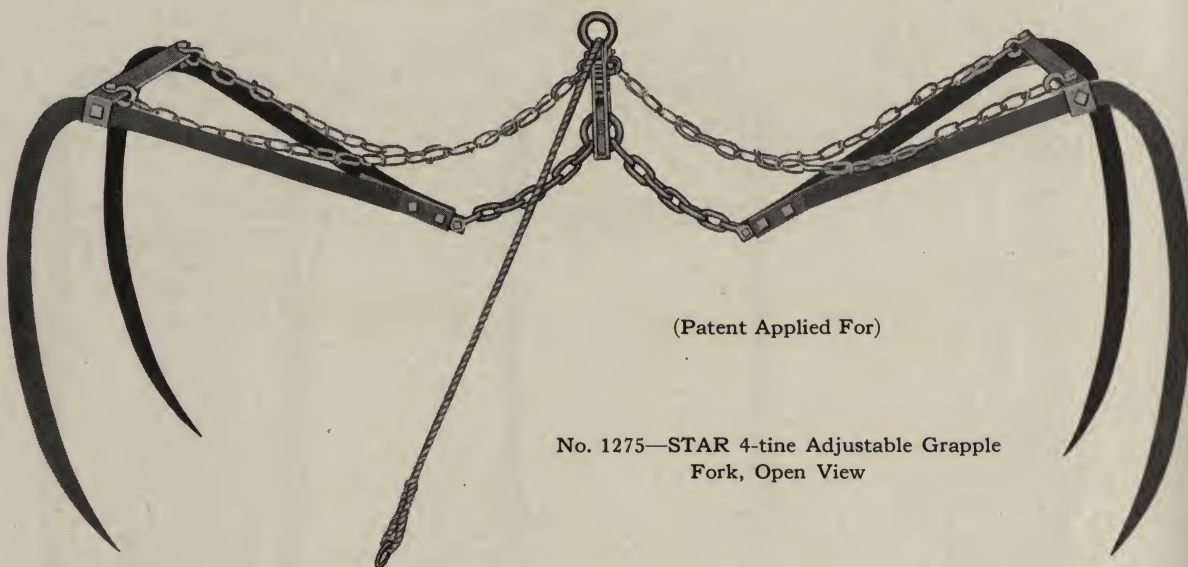
Fig. 96

Made of special spring steel, 1¼ x ¾, with malleable lever and barbs. It has a large capacity owing to

the cross-bar being placed near top of fork. Length under the cross-bar, 30 inches. The special feature is that it locks open as well as closed. Weight, 25 lbs.



No. 1274 Star 4-tine Adjustable Grapple Fork



(Patent Applied For)

No. 1275—STAR 4-tine Adjustable Grapple Fork, Open View

HERE is a new grapple fork of large capacity, which does not require a giant to handle it as it would if the center connection was rigid.

A man of ordinary size and strength can get the full benefit of the tremendous loads this giant fork takes up. The center connection is made with flexible chains. Each set of tines can be shoved down into the load one at a

time. You can set one side of this fork first and then set the other. The dumping chains—the upper set—can be detached, leaving the fork free for easier handling when setting it in the load.

The above illustration shows the fork adjusted to full size—72 in. between the tines. The spread of this fork is easily and quickly narrowed by removing two bolts and shortening the heavy chains which extend from the center lock ring to each set of tines.

By inserting the bolts through different lengths the chains are thus shortened.

The tines are made of extra strong highly tempered spring steel—strong clear down to the point. Locked at the shoulders to a heavy steel angle, they cannot get out of place or out of shape.

The lock is sturdy and simple. It has very few parts. It is so protected that it cannot be opened by accidental bumping or jerking. It is a positive lock and always snaps open promptly at a jerk of the trip rope.

When the lock is tripped open the tines spread and dump the load. While open the tines hang straight up and down. This prevents any part of the load sticking to the tines and giving trouble.

No. 1274 Giant Fork has an extreme spread of 72 in., which can be adjusted down to 56 in. Width between outside tines 19 in. Each tine can be inserted 27 in. into the hay. Weight, each, 40 lbs.



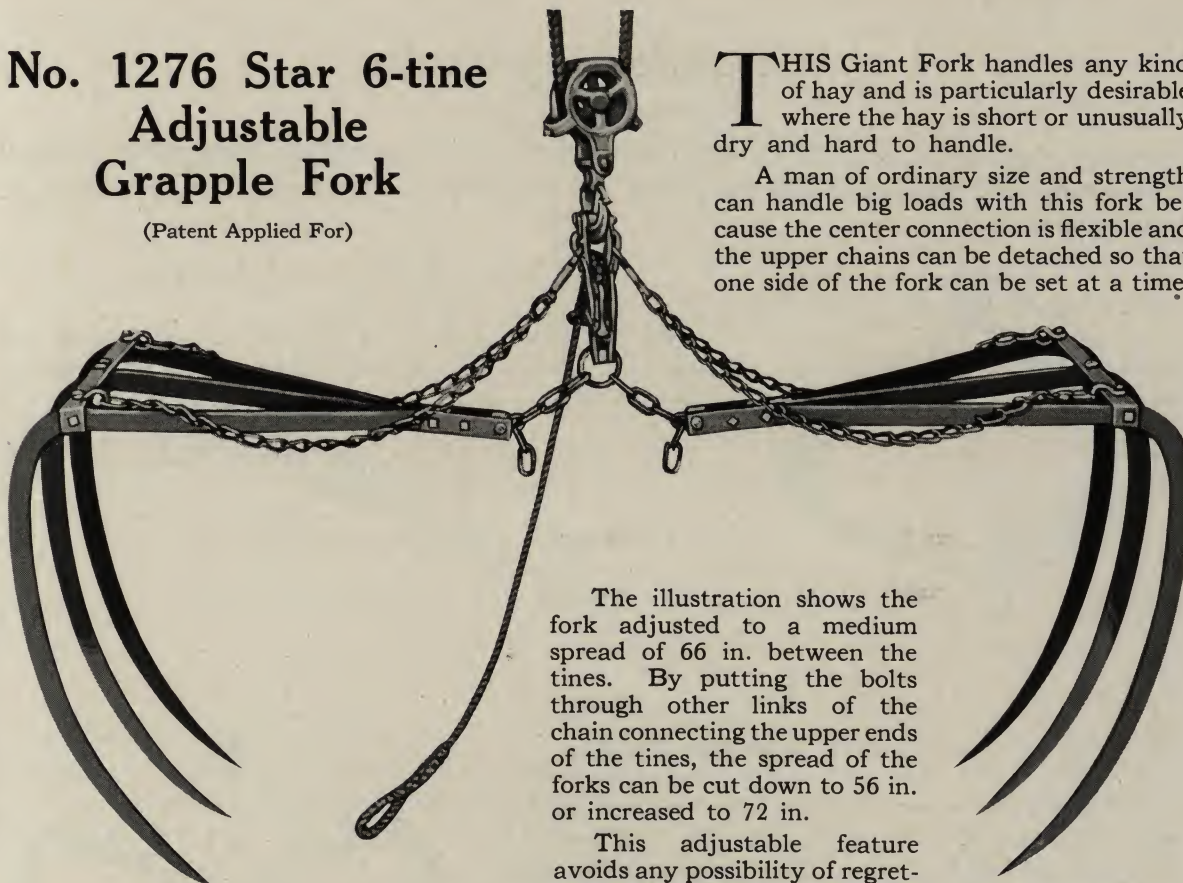
No. 1274—Star 4-tine Adjustable Grapple Fork, Closed View.

No. 1276 Star 6-tine Adjustable Grapple Fork

(Patent Applied For)

THIS Giant Fork handles any kind of hay and is particularly desirable where the hay is short or unusually dry and hard to handle.

A man of ordinary size and strength can handle big loads with this fork because the center connection is flexible and the upper chains can be detached so that one side of the fork can be set at a time.



The illustration shows the fork adjusted to a medium spread of 66 in. between the tines. By putting the bolts through other links of the chain connecting the upper ends of the tines, the spread of the forks can be cut down to 56 in. or increased to 72 in.

This adjustable feature avoids any possibility of regretting having bought too small or

too large a fork. This fork adjusts to the size you want—right on the job.

No. 1276 Grapple Fork, widest opening 72 in. Can be adjusted down to 56 in. spread. Width between outside tines 19 in. Tines can be inserted 27 in. into the hay. Weight, each, 50 lbs.

No. 1276 STAR 6-tine
Adjustable Grapple Fork

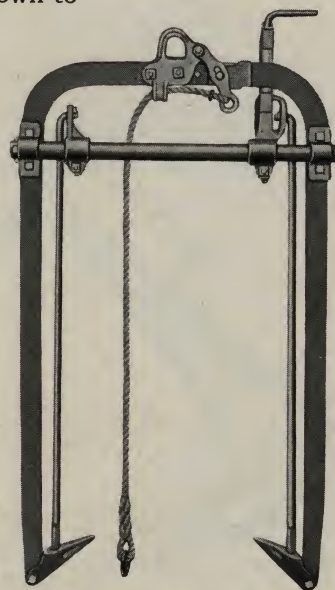
No. 1275 Star Lock Lever Harpoon Fork

THE lock lever on this fork is a decided improvement. The handle pulls out to give a greater leverage which makes it much easier to close the barbs.

The handle of the locking lever is parallel with the head of the fork which makes it still more convenient, much easier and much quicker to set the fork and to lock in the load.

The handle drops back to the position shown in the illustration after the load is locked. A jerk of the trip rope opens the lock and releases the load. This fork is made of unusually heavy, highly tempered spring steel with certified malleable fittings.

Height under bar, 30 in. Width between tines, 18 in. Weight, each, 23 lbs.



No. 1275 STAR Lock Lever
Harpoon Fork

Grapple Hay Forks

The Automatic Safety Grapple Fork without Center Tine, especially adapted for the quick handling of loose or baled hay, fodder, etc. Constructed of high carbon spring steel.



Fig. 558

Six Tine Safety Grapple Fork

Fig. 558 shows 6-tine Grapple Fork closed after it has released the load and comes back to the wagon, ready for the operator to pick it up and place it in the hay as desired.

This fork trips easily from any direction, is double braced, very strong and guaranteed.

This fork has a spread of 55 inches.

Weight, Fig. 558, 6-tine fork, each 47 lbs.

Four Tine Safety Grapple Fork

Fig. 559 shows 4-tine fork open and ready to set in hay. The pull on the trip rope releases load and the fork closes and locks automatically as shown in Fig. 558, eliminating the danger from an open fork descending to the load over the operator.

Weight, Fig. 559, 4-tine fork, each 40 lbs.

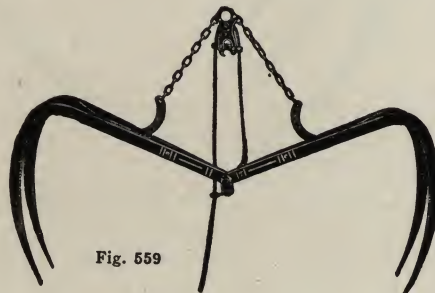


Fig. 559



Fig. 833

Giant Safety Grapple Fork

The Giant Automatic Safety Grapple Fork is of the same general design as that shown above but is much larger, heavier and stronger. It has an extreme spread of 63 inches between the points of the tines when open and has a correspondingly greater capacity.

Weight, Fig. 833, 4-tine fork, each 48 lbs.

Weight, Fig. 834, 6-tine fork, each 56 lbs.

Hay Forks Jackson Pattern

The greatest strength and capacity with the least amount of weight were the first objects to be secured in the construction of this fork. It is made in the following sizes:

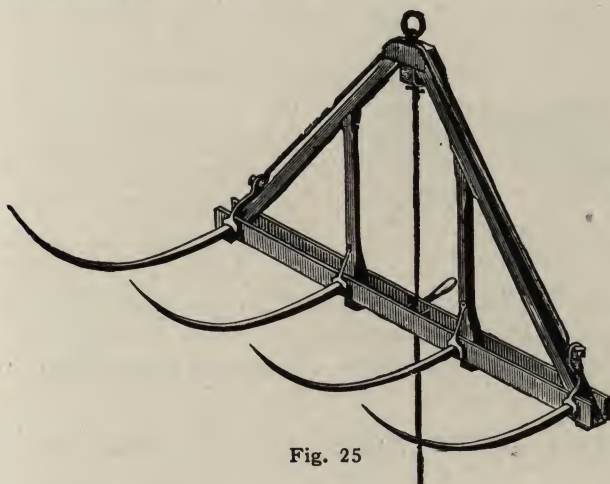


Fig. 25

3½ foot, with four tines, a light fork for hay.

4 and 4½ foot, with four tines, for threshing machines and stacking hay.

5 and 6 foot, with six tines for heading or large loads.

Made in six sizes:

3½ ft.	4 tine,	50 lbs.
4 ft.	4 tine,	53 lbs.
4½ ft.	4 tine,	63 lbs.
5 ft.	6 tine,	74 lbs.
5½ ft.	6 tine,	76 lbs.
6 ft.	6 tine,	78 lbs.

The tines are made of high grade spring steel and the material used throughout is of the very best. The trip latch is reliable. It has convenient hand-holds on the head, which are of great assistance in operating the fork. The woodwork is neatly made, all riveted and constructed so as to get the greatest possible strength. The fork is guaranteed to be strong and reliable, and is warranted to do good work.

Stacking Outfits

No. 504 Star Hay Carrier described on page 187 is made with grooved wheels to operate on cable track. The illustration at the right shows the manner in which the cable hay stacking outfit is generally used.



The amount of cable required varies with the height of the poles and the distance apart from one set of poles to another.

The cable we furnish measures 5/8 inches in diameter and is made up of six strands of seven wires each. It is extra galvanized by a special process. The galvanizing does not chip or flake.

Weight, per one hundred feet, 62 pounds.

Cable Clamps



Fig. 936

Fig. 936 Cable Clamp is used to fasten each end of the cable where it is doubled back to form a loop. Weight 1¼ lbs. each.

Fig. 946 Cable Clamp is placed on the cable just inside of poles to prevent poles slipping and falling towards the center. Weight 1¼ lbs. each.

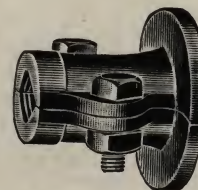


Fig. 946

Two clamps of each type are required for each stacking outfit.



Material for Hay Carrier Outfits

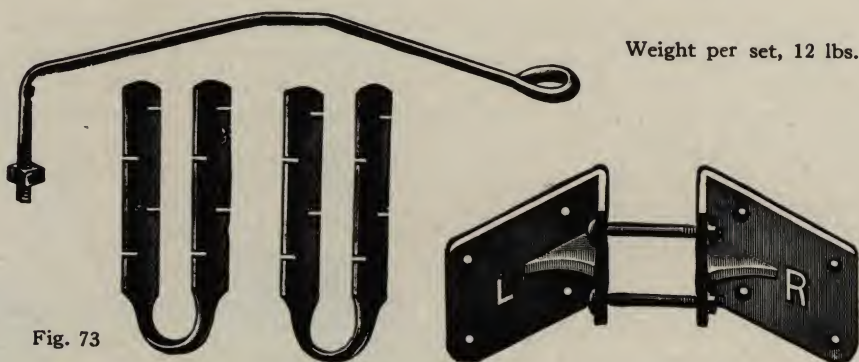
SNATCH PULLEY BLOCK



Fig. 90

The Snatch Pulley Block shortens the travel of the horse. Tie a knot in the rope and put the washer in front of it. The rope can then be thrown off the snatch pulley thus allowing the fork to be returned to the load without waiting for the return of the horse. Weight per dozen, 60 lbs.

FIXTURES FOR SUPPORTING STEEL HAY CARRIER TRACK AT END OF BARN



Weight per set, 12 lbs.

Fig. 73

Cuts Showing a Set of Fixtures for Supporting Steel Track at the End of Barn

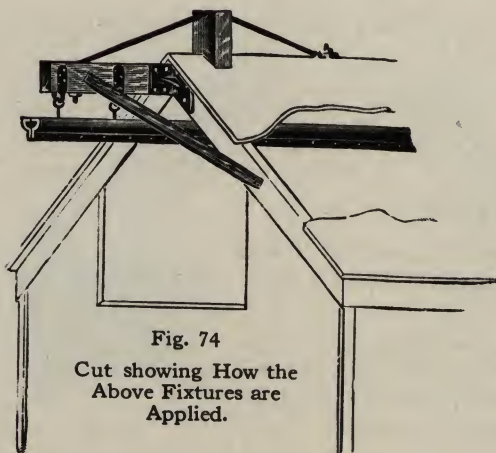


Fig. 74

Cut showing How the Above Fixtures are Applied.

Many ways have been devised for supporting steel track at the end of barn, nearly every carpenter having a way of his own which has not always proven to be the best. It is important that the track at end of barn should be well supported because the heavy pull is at this place, and a little defect in supporting the track will cause a great deal of trouble. We show in the above cut a means of doing this, which we believe to be as good as any other, if not the best way. We are prepared to furnish the above fixtures complete and ready for use at a reasonable price.

A set consists of two heavy angle-shape castings with bolts; one bar, $\frac{1}{2}$ -inch round iron, 8 feet long, with eye at one end and nut at the other; two malleable ridge pole hangers.

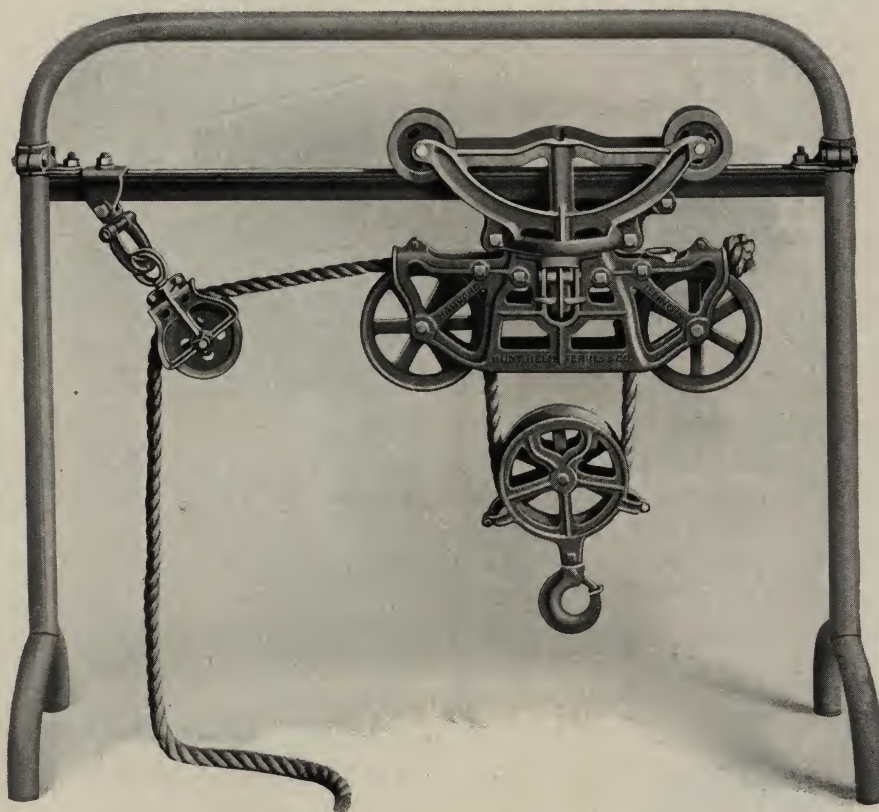
Dealer's Hay Carrier Display Rack

A practical display rack, designed for dealer's use in displaying and demonstrating STAR Haying Tools.

A carrier so mounted and prominently displayed will attract prospective buyers of Haying Tools.

Dealers can point out to advantage and demonstrate the greater strength, weight and durability, as well as ease of operation, of these carriers.

This display rack is built of steel tubing, is 44 inches high and 48 inches wide. Furnished free (except for carrier, clamp and pulley) with an order specifying the necessary amount of Haying Tools. Only furnished with carrier mounted. Specify type of carrier. Weight, each, 47 lbs.



Star Bracket Pulley Holder

No. 821 STAR Bracket Pulley Holder works with any ordinary pulley.

The STAR Bracket Pulley Holder is used to support a pulley carrying the draft rope through either the side or end of the barn. It permits using the smallest possible amount of draft rope.

To attach this Bracket Pulley Holder, cut a hole in the barn siding 4 inches wide and 8 or 10 inches long. The holes for the side braces of the bracket should be on a line with the top of the opening. The pulley can be attached or removed from the inside or outside of barn.

This inexpensive arrangement permits a material saving of rope and reduces friction to a minimum. Weight, each, 3 lbs.

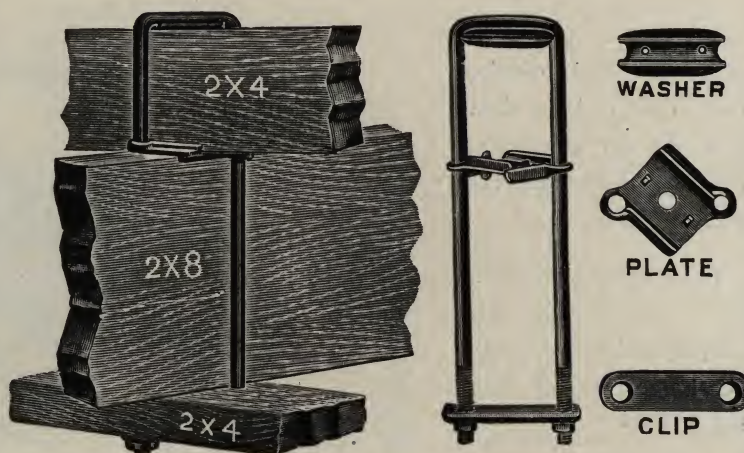


Fig. 821

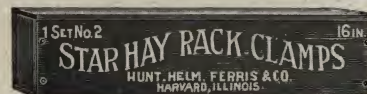
New Star Hay Rack Clamps

THE STAR Hay Rack Clamp is so simple that any one can put a rack together with it, the only tools needed being a wrench, saw, bit and brace.

When the clamps are tightened the rack is rigid, and the intermediate bracket being studded and flanged, twisting or slipping of the timbers at the joints is impossible. The clamps, which are placed astride the timbers are twice as strong as bolts. A grooved steel washer makes it impossible for the clamp to cut into the crosspiece, and the steel clip or washer keeps the bottom crosspiece from splitting.



STAR Hay Rack Clamps are made of $\frac{3}{8}$ in. rods in four different sizes, put up one set of 8 clamps in a box.



No. 0.	Star Hay Rack Clamp, 12-inch.	11	lbs. per set.
No. 1.	Star Hay Rack Clamp, 14-inch.	13	lbs. per set.
No. 2.	Star Hay Rack Clamp, 16-inch.	14	lbs. per set.
No. 3.	Star Hay Rack Clamp, 18-inch.	14½	lbs. per set.

No. 435 Star Offset Hinges



Fig. 435
Hinge

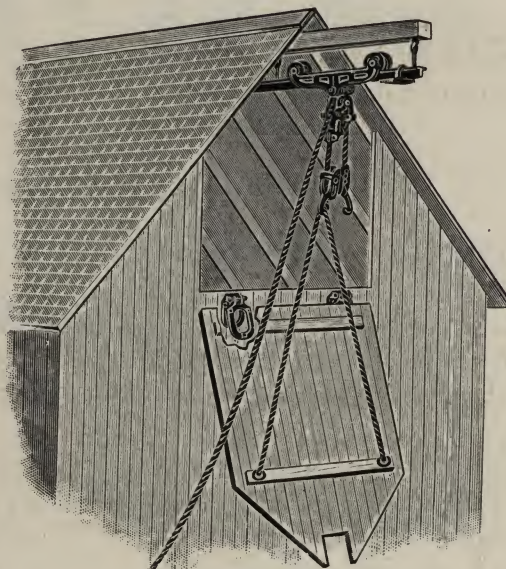


Fig. 436
Hinge on Gable Door

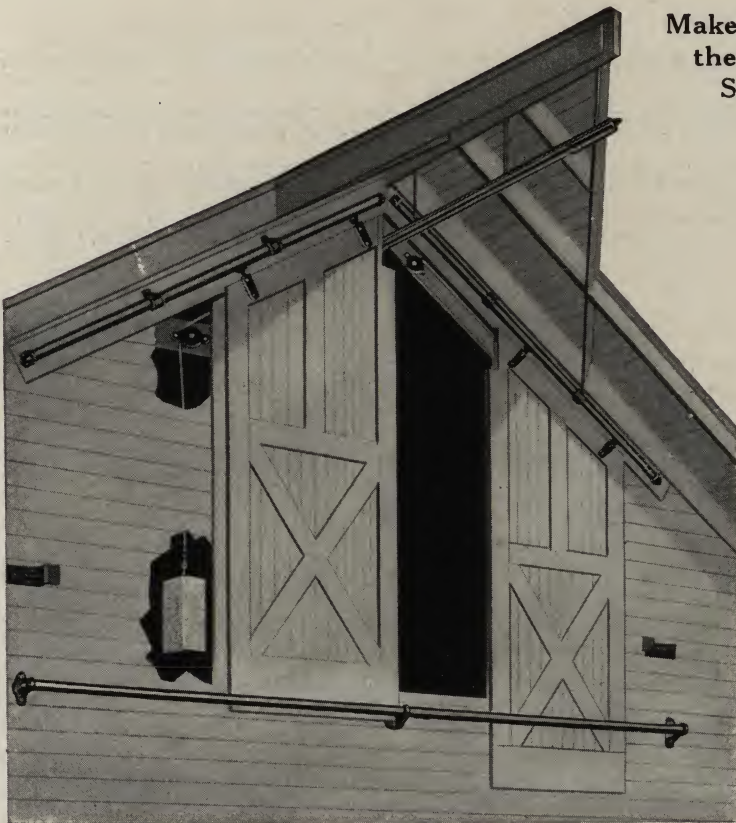
BY using STAR Offset Hinges rain or snow will be kept out of the gable end of the barn. Fig. 436 shows a method by which the door can be raised when desired by attaching a rope fastened to the door to one of the pulley blocks attached to the Carrier. By running the Carrier into the barn by means of the draft rope the door will be pulled up.

STAR Offset Hinges are made of malleable iron, held together by steel pins and cotters.

Weight, per set, 3 lbs.

No. 906 Cannon Ball Gable Door Fixtures

Makes Barn Lofts More Efficient for the Quick Handling of Hay and Straw — Gives Barns a Neater Outside Appearance



HERE is the new Cannon Ball Gable Door Set for use with Cannon Ball Hangers and Track or any other make of hanger and track.

Each set consists of 50 feet of heavy three-sixteenths inch flexible wire cable, four steel pulleys, two end bumpers, two end brackets, and splice bracket for pipe and sufficient staples and lag screws. Ready to install with hanger and track.

Weight per set, 16 lbs.

After track is hung parallel with door and one pair of hangers attached in regular way, counterbalance doors with concrete weights, attached to steel cable which passes over two iron pulleys above each door. This will give you quiet and easy operating Gable End Doors.

Track, Hangers and Guard Pipe Required

Two pairs of hangers are required for doors of any width—one pair for each door.

Width of Opening	Track	Splice Brackets	Slip Brackets	End Brackets	One Inch Pipe
8-9-10 ft.	2 6 ft., 2 4ft. pcs.	2	6	4	16-18-20 ft.
12 ft.	2 6 ft., 2 8 ft. pcs.	2	10	4	24 ft.

Install a Cannon Ball Gable End Door Set Now and Get the Value From Its Service

The one-inch pipe runs along bottom of doors. This is placed to keep doors from swinging. They are always against building where they belong. Two end brackets and center bracket are furnished to support pipe.

All These Items Are Included In Sets Except Pipe, Track and Hangers



Hay Tool Equipment Required For End Drive Barns

For Steel Track and Carriers

- 50-FOOT BARN:** 1 Carrier, 48 ft. Track, 25 Hangers, 25 Rafter Brackets, 1 Fork, $2\frac{1}{2}$ lbs. Bracket Nails, 3 Pulleys, 2 Floor Hooks, 1 Bracket Pulley Holder.
- 60-FOOT BARN:** 1 Carrier, 60 ft. Track, 31 Hangers, 31 Rafter Brackets, 3 Pulleys, 3 lbs. Bracket Nails, 2 Floor Hooks, 1 Fork, 1 Bracket Pulley Holder.
- 70-FOOT BARN:** 1 Carrier, 66 ft. Track, 34 Hangers, 34 Rafter Brackets, $3\frac{1}{2}$ lbs. Bracket Nails, 3 Pulleys, 1 Fork, 2 Floor Hooks, 1 Bracket Pulley Holder.
- 80-FOOT BARN:** 1 Carrier, 78 ft. Track, 40 Hangers, 40 Rafter Brackets, 4 lbs. Bracket Nails, 3 Pulleys, 1 Fork, 2 Floor Hooks, 1 Bracket Pulley Holder.

For Wood Track Carriers

- 50-FOOT BARN:** 1 Carrier, 26 Hanging Hooks, 26 Rafter Brackets, $2\frac{1}{2}$ lbs. Bracket Nails, 3 Pulleys, 2 Floor Hooks, 1 Bracket Pulley Holder, 1 Fork.
- 60-FOOT BARN:** 1 Carrier, 31 Hanging Hooks, 31 Rafter Brackets, 3 lbs. Bracket Nails, 3 Pulleys, 2 Floor Hooks, 1 Fork, 1 Bracket Pulley Holder.
- 70-FOOT BARN:** 1 Carrier, 36 Hanging Hooks, 36 Rafter Brackets, $3\frac{1}{2}$ lbs. Bracket Nails, 3 Pulleys, 1 Fork, 2 Floor Hooks, 1 Bracket Pulley Holder.
- 80-FOOT BARN:** 1 Carrier, 41 Hanging Hooks, 41 Rafter Brackets, 4 lbs. Bracket Nails, 3 Pulleys, 1 Fork, 2 Floor Hooks, 1 Bracket Pulley Holder.



Directions For Putting Up Star Steel Track

TRACK should extend far enough outside of barn so that trip block can be bolted to under side of track over a rivet head at least two feet beyond building. Most carpenters have a satisfactory way of supporting the track which projects out from the building and new barns are being built that way. Fixtures for supporting track at end of any barn are shown on page 216.

A Chalk line should be stretched from end to end to get rafter brackets even. One rafter bracket should be placed on each pair of rafters. Put the necessary hangers into each section of track and fasten them to the rafter brackets. The lengths of track should be spliced together as you go along, drawing all bolts up tight.

Trip Block should be securely bolted to under side of track over a rivet head. Stop blocks should be placed at both ends of track. Stop block on the inside end should be shoved up snugly against a 2x6 collar beam resting across the top of the track and bolted to the last pair of rafters. This prevents end sway.

ROPE—A good grade of $\frac{3}{4}$ in. or $\frac{7}{8}$ in. rope is recommended. It works nicer and will last longer than a 1 in. rope of cheaper grade. To find the amount of rope required take three times the height from ground to track, add the length of the barn and about 25 feet more.

Hay Tool Equipment Required for Center Drive Barns

For Steel Track and Carriers

50-FOOT BARN: 1 Carrier, 42 ft. Track, 22 Hangers, 22 Rafter Brackets, 2½ lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

60-FOOT BARN: 1 Carrier, 54 ft. Track, 28 Hangers, 28 Rafter Brackets, 3 lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

70-FOOT BARN: 1 Carrier, 66 ft. Track, 34 Hangers, 34 Rafter Brackets, 3½ lbs. Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

80-FOOT BARN: 1 Carrier, 78 ft. Track, 40 Hangers, 40 Rafter Brackets, 4 lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

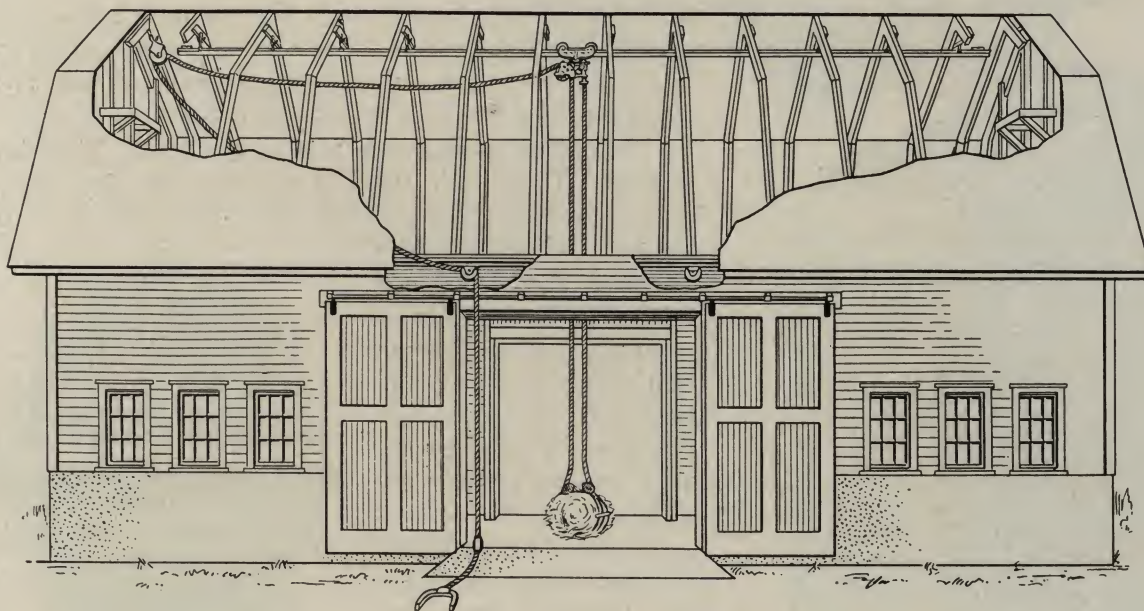
For Wood Track and Carriers

50-FOOT BARN: 1 Carrier, 26 Hanger Hooks, 26 Rafter Brackets, 2½ lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

60-FOOT BARN: 1 Carrier, 31 Hanger Hooks, 31 Rafter Brackets, 3 lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

70-FOOT BARN: 1 Carrier, 36 Hanger Hooks, 36 Rafter Brackets, 3½ lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.

80-FOOT BARN: 1 Carrier, 41 Hanger Hooks, 41 Rafter Brackets, 4 lbs. Bracket Nails, 3 Pulleys, 6 Floor Hooks, 1 Fork or 3 Slings.



Directions for Installing Steel Track

TRACK with rafter brackets and hangers are installed same as for end drive barn described on preceding page. Stop Blocks at both ends of track are bolted snug up against a 2x6 collar beam resting across top of track and bolted to pair of rafters.

Trip Block is bolted to the under side of track over rivet head directly above the center of the driveway.

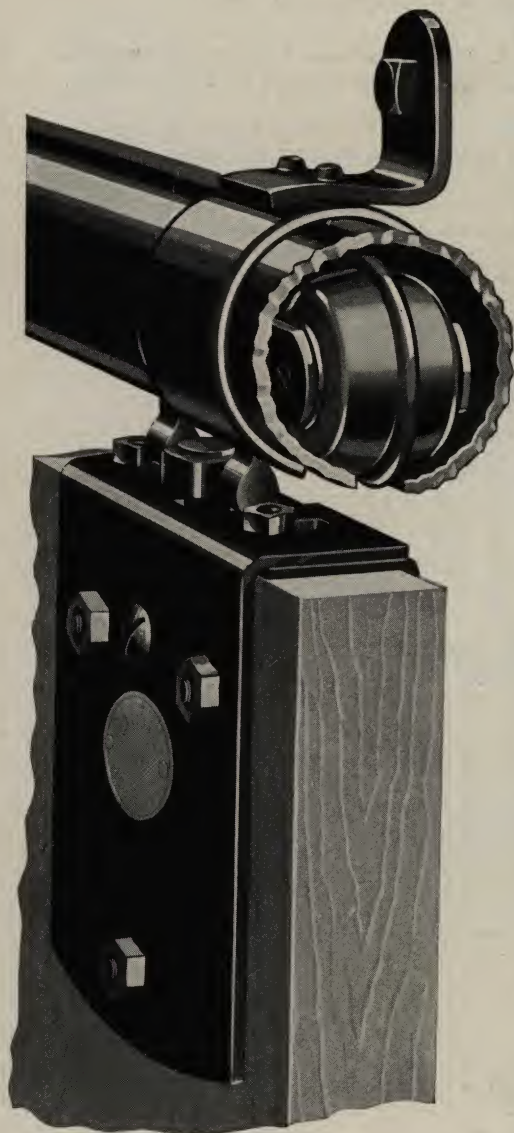
When the bay or mow on one side of the drive has been filled with hay the carrier can be reversed and the

three pulleys hooked up on the other side of the drive without re-roping.

ROPE—Take twice the height from floor to track, add length of barn and height from floor to plate. Then add about 25 ft. to allow plenty of room for the team.

A good grade of ¾ in. or ⅞ in. rope should be used. It will work nicer and wear longer than inch rope of a cheaper grade.

Cannon Ball Door Hangers



CANNON BALL Hangers work so much easier and last so much longer they are the natural choice when a careful investigation is made of hangers for sliding doors of any sort.

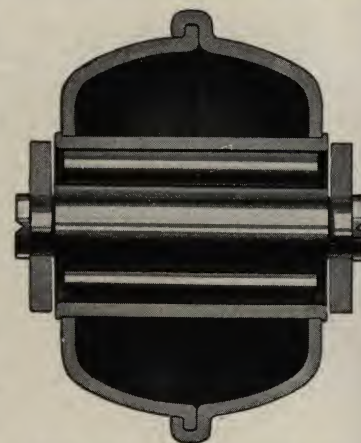
Cannon Ball wheels of heavy pressed steel are accurately formed in dies. They are protected from weather and dirt by the track which encloses them. They always run smoothly because they operate in a track that is perfectly round and self cleaning—no flat surface where dust and rust scale can gather and pile up to block the movement of the hangers.

The ball wheels of Cannon Ball Hangers conform to the shape of the track. They have an even bearing on both sides no matter how the building warps or sags and no matter how the track is sprung or tilted.

The roller bearings are long— $1\frac{3}{16}$ inches. They lay straight. They can't twist or pile up and they can't wear unevenly. One of the important reasons why Cannon Ball hung doors run easy after years and years of use.

One type of Cannon Ball Hanger in use a dozen years on thousands and thousands of buildings has never brought a single complaint.

In the hangers shown on the following pages are retained the basic principles of design and sturdy construction with new methods of adjustment and a door-strap of improved pattern.



Actual size—sectional view—Cannon Ball Wheel

Showing the 10 long cold rolled steel roller bearings— $1\frac{3}{16}$ inches long—surrounding the cold rolled steel shouldered axle.

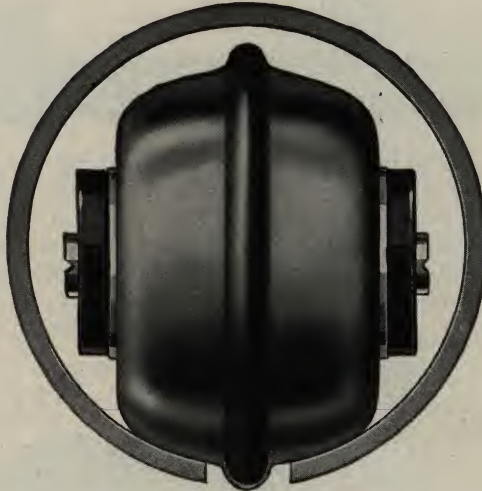
The door-straps of the Cannon Ball Hangers are adjustable for doors made of either two or three thicknesses of boards. They hold the top of the door unusually close to the bottom of the track; you don't have to set the

hangers into notches in the door top to bring the door up where it belongs.

The distinctive neatness of the Cannon Ball Hanger is materially enhanced by the attractive metal name plate on the face of the strap.

No wonder "Cannon Ball beats 'em all."

Cannon Ball Door Track



(Actual Size)

CANNON Ball Track is a big factor in the well-earned popularity of Cannon Ball Door Hangers.

It is made of 13-gauge steel, the thickest steel used for making enclosed door tracks.

The track being perfectly round with no kinks, corners or sharp bends, the hardest and stiffest kind of steel can be used. It takes a pressure of fifty tons to the foot to shape Cannon Ball Track from the heavy 13-gauge spring steel of which it is made.

The steel becomes "upset"—driven together or compressed—in the course of manufacture. That holds it in shape and gives it greater thickness and strength.

Cannon Ball Track is self-cleaning.

Cannon Ball Track being perfectly round the steel ball wheels of the hangers have a perfect bearing on both sides of the slot. The slot is at the lowest point in the track; dust, dirt and rust scales which might accumulate and pile up on a flat surface rattle out through it as the hangers are operated.

Cannon Ball Track lines up perfectly at the joints. Every length of track is notched at each end. This notch fits over a rivet head inside the splice. A similar notch in the other piece which enters the same splice also fits over a rivet head. This makes the track line up accurately.

Every splice is a bracket, held in place by a lag screw or bolt. Where additional supporting brackets are required, they can be placed at any desired place on the track and are as easy to hang as the splice brackets.

With brackets spaced three feet apart, Cannon Ball Track and Hangers will operate perfectly with doors weighing up to 400 pounds. With doors 400 to 600 pounds, brackets should be spaced two feet apart.

Because of its round shape, Cannon Ball Track is easiest to erect. Builders as a rule use the track in 3-foot lengths, regarding it as the most convenient, but longer lengths are furnished for those who prefer them.

Giant Cannon Ball Beats 'Em All

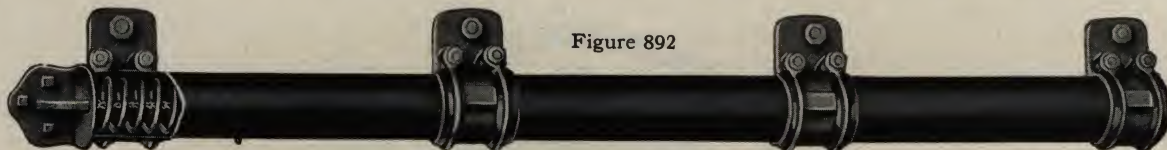


Figure 892

ABOVE illustration shows the Nos. 387 or 681 heavy, 13-gauge Cannon Ball Track held by No. 880 Giant Cannon Ball Brackets for use with the No. 881 Giant Cannon Ball Hangers. Brackets 24 in. apart for 800 lb. doors; 18 in. apart for 1,000 lb. doors.

The end of the track is broken away to show the location of No. 889 spring cushion. Two No. 893 End Stops, shown in this illustration, and two of the No. 889 Spring Cushion Stops are included with each pair of No. 881 Hangers.

No. 881 Giant Cannon Ball Hanger

Roller Bearing

**For Use With No. 880 Giant Cannon Ball Bracket
And Nos. 387 or 681 Cannon Ball Track
To Handle Doors Weighing Up to 1,000 Pounds**

Lateral and vertical adjustments and adjustment for thickness of doors.

Pressed steel ball wheels $2\frac{1}{4}$ -in. in diameter. Ten cold rolled steel bearings in each wheel $\frac{1}{4}$ -in. x $1\frac{3}{16}$ in. Heavy, underslung, double tandem trucks with flexible joints.

Pressed steel door strap $10\frac{1}{4}$ in. long, 4 in. wide, $\frac{3}{16}$ in. thick. Punched for 5 $\frac{3}{8}$ -in. bolts. For doors from $1\frac{3}{4}$ in. to 3 in. thick.

Vertical adjustment permits doors to be raised or lowered at either end by turning the suspension bolt which connects the stirrup with the door strap.

The stamped steel piece which fits around the adjusting bolt and lies flat on top of the door strap locks the adjusting bolt as shown in the illustration. By lifting this piece up clear of the door strap bolts it can be used as a wrench to turn the adjusting bolt and raise or lower the door.



Figure 881

Clearance between bottom of track and top of door $3\frac{1}{2}$ to $4\frac{1}{4}$ in.

Bottom of track to center of hole in bracket $5\frac{1}{8}$ in.

Finished in black japan.

Packed one pair of hangers with $10\frac{3}{4}$ x $\frac{3}{8}$ in. bolts, 2 No. 889 Spring Stops, and 2 No. 893 End Stops in heavy carton.

Weight per pair, 27 lbs.

Spring Cushion Stop Furnished With Each Hanger

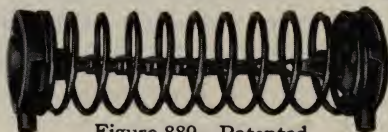


Figure 889—Patented

Two of the No. 889 Cushion Stops are furnished with each pair of No. 881 Hangers.

They are inserted in the end of the track after the doors are hung and before the end stop is put on.

The advantage of this is obvious where heavy doors are used. They require no adjustment or attention of any kind. They can't be put in wrong.

Giant Cannon Ball Beats 'Em All

No. 880 Giant Cannon Ball Bracket

Used With Cannon Ball Track

AND

No. 881 Giant Cannon Ball Hangers

For Doors Weighing Up to 1,000 Pounds

For doors weighing 600 to 800 lbs. brackets should be spaced 24 inches apart.

For doors weighing from 800 to 1,000 lbs. brackets should be spaced 18 inches apart.



Figure 880

THIS big, massive, heavy ribbed bracket made of the toughest kind of malleable iron is used to support Cannon Ball Track in connection with the No. 881 Giant Cannon Ball Hangers for handling extra heavy doors.

This bracket can be placed anywhere along the track as illustrated on the opposite page.

A heavy steel lock fits into slots in the ends of both pieces of track where they come together inside the bracket. A recess in the upper half of the bracket fits over this lock, holds it in place and makes a lock joint splice.

Nos. 387 and 681 Heavy Cannon Ball Track in 3, 4, 6 and 8 ft. lengths is used with this bracket. It is made of 13-gauge material. Being formed on a perfect circle without sharp bends, the stiffest, toughest, springiest, high carbon steel is used. It is easiest to put up and hardest to pull down.

No. 880 Giant Cannon Ball Bracket. Finished in black japan. Weight per dozen, 32 lbs.



Cannon Ball Door Hangers

No. 1068—Roller Bearing

For doors weighing 400 pounds
Lateral and vertical adjustments and
adjustment for thickness of doors



PRESSED steel ball wheels $2\frac{1}{4}$ inches in diameter. Ten cold rolled steel bearings $\frac{1}{4}$ inch x $1\frac{3}{16}$ inches. Underslung tandem truck. Flexible joint. Heavy pressed steel strap $6\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide, $\frac{1}{8}$ inch thick, punched for $\frac{5}{16}$ inch bolt. For doors from $1\frac{3}{4}$ to $2\frac{1}{2}$ inches thick.

Vertical adjustment permits doors to be raised or lowered at either end by turning suspension bolt which

connects stirrup with door strap.

Finished in black japan enamel.

Each pair of hangers with six $2\frac{3}{4}$ x $\frac{5}{16}$ inch bolts in paper box. Packed six pairs in heavy carton.

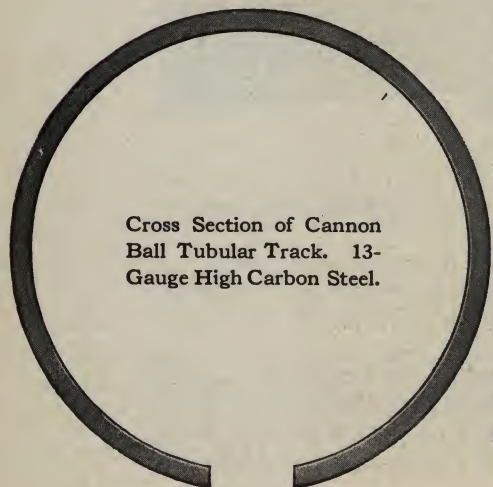
Weight per dozen, 95 lbs.

Clearance between bottom of track and top of door, $1\frac{1}{4}$ to 2 inches.

Bottom of track to center of hole in bracket $3\frac{3}{8}$ inches.

No. 1068 Cannon Ball Hangers for use with Nos. 387, 777, 681, 933 and 651 door tracks.

See pages 225 to 236 for track and bracket specifications.



Cross Section of Cannon Ball Tubular Track. 13-Gauge High Carbon Steel.



Cannon Ball Door Hangers

No. 1067—Roller Bearing

For doors weighing up to 400 pounds
Lateral adjustment and adjustment for thickness of doors



PRESSED steel ball wheels $2\frac{1}{4}$ inches in diameter. Ten cold rolled steel bearings $\frac{1}{4}$ inch x $1\frac{3}{16}$ inches. Underslung tandem truck. Flexible joint. Heavy pressed steel strap $6\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide, $\frac{1}{8}$ inch thick, punched for $\frac{5}{16}$ inch bolts. For doors from $1\frac{3}{4}$ to $2\frac{1}{2}$ inches thick. Adjusting screw operates through hole in face of door strap. Permits door to be

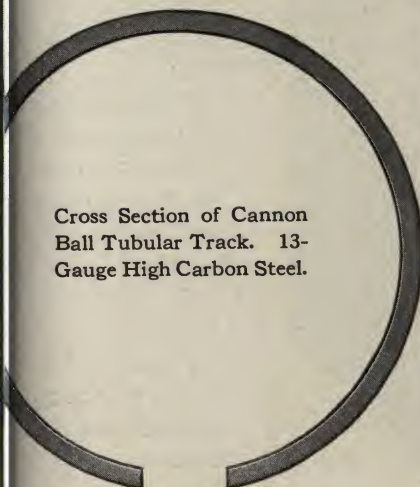
brought closer to or farther away from building.

Finished in black japan enamel.

Each pair of hangers with six $2\frac{3}{4}$ x $\frac{5}{16}$ inch bolts in paper box. Packed six pairs in heavy carton.

Weight per dozen, 93 lbs.

Cross Section of Cannon Ball Tubular Track. 13-Gauge High Carbon Steel.



Clearance between bottom of track and top of door, 1 inch.

Bottom of track to center of hole in bracket $3\frac{5}{8}$ inches.

No. 1067 Cannon Ball Hangers for use with Nos. 387, 777, 681, 933 and 651 door tracks.

See pages 229 to 236 for track and bracket specifications.





Cannon Ball Door Hangers

No. 384—Roller Bearing

For Doors Weighing
up to 400 Pounds



PRESSED steel ball wheels, $2\frac{1}{4}$ inches in diameter. Ten cold rolled steel roller bearings $\frac{1}{4}$ inch by $1\frac{3}{16}$ inches. Underslung tandem truck. Flexible joint. Heavy pressed steel strap $6\frac{1}{2}$ inches long, $1\frac{3}{4}$ inches wide, $\frac{1}{8}$ inch thick, punched for $\frac{5}{16}$ inch bolts. For 2 inch doors. Finished in black japan enamel.

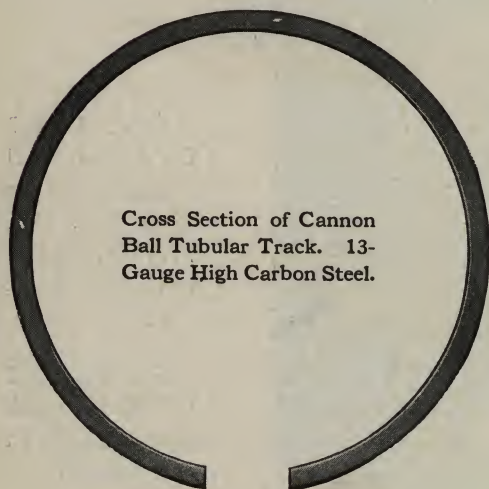
Each pair of hangers with four $2\frac{1}{4}$ by $\frac{5}{16}$ inch bolts in paper box. Packed six pairs in heavy carton. Weight 70 lbs. per dozen.

Clearance between bottom of track and top of door, 1 inch.

Bottom of track to center of hole in bracket $3\frac{5}{8}$ inches.

No. 384 Cannon Ball Hangers for use with Nos. 387, 777, 681, 933 and 651 door tracks.

See pages 229 to 236 for track and bracket specifications.



Cross Section of Cannon Ball Tubular Track. 13-Gauge High Carbon Steel.



Cannon Ball Door Track

(Continued)



CANNON Ball Track in 3-foot lengths is the most popular tubular track on the market. Its reputation has placed it on the shelves of practically every dealer in America. Being tubular in shape, the hangers operating inside of it are completely enclosed. This construction permits the hangers to operate noiselessly and without friction.

Cannon Ball Track is not only bird-proof but also weatherproof and its shape makes it self-cleaning. The standard 3-foot lengths are preferred by builders because of ease of installation. Brackets for use with this track are shown on the following pages.

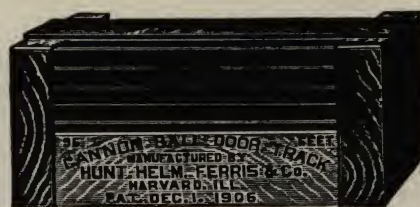


Fig. 388

No. 387 Cannon Ball Tubular Track, built in 3-foot sections, is packed 96 feet to the crate, weighing 220 pounds.

No. 681 Long Length Cannon Ball Tubular Track



Fig. 681

An eight foot length of track showing one splice bracket, two intermediate brackets and one end bracket.

TO supply the demand for lengths longer than 3 feet, Cannon Ball Track is furnished in 4, 6 and 8-foot sections. Aside from the difference in length, the track is exactly like that shown above. These lengths in combination with the 3-foot sections will accommodate any width of door.

Cannon Ball Track in long lengths is packed 100 feet to the crate consisting of three 4-foot, four 6-foot and eight 8-foot sections. Weight per crate, 230 lbs.

Brackets for use with No. 681 Cannon Ball Tubular Track shown on the following pages.

Cannon Ball Track Brackets

Side Brackets for Single Track

With holes for $\frac{3}{8}$ in. lag screws



682



683



680

NO. 682 Cannon Ball Splice Bracket. Used to join Cannon Ball sections of any length. The two rivets which fasten the bracket to the splice engage slots in ends of rail sections, making a perfect joint. Packed two dozen and four dozen to the crate of 23 pounds and 45 pounds.

No. 683 Cannon Ball Intermediate Bracket. Used where necessary to support Cannon Ball Track between joints. So shaped that rivets inside the bracket clear top of track; this permits bracket to be located anywhere along the track. Packed two and four dozen to the crate of 23 and 45 pounds.

No. 680 Cannon Ball End Brackets. Used at both ends to support the track. They close the end of it, making it bird-proof. Packed one dozen and two dozen to the crate of 8 pounds and 16 pounds.

Side Brackets for Double Track

With holes for $\frac{3}{8}$ in. lag screws



696



803

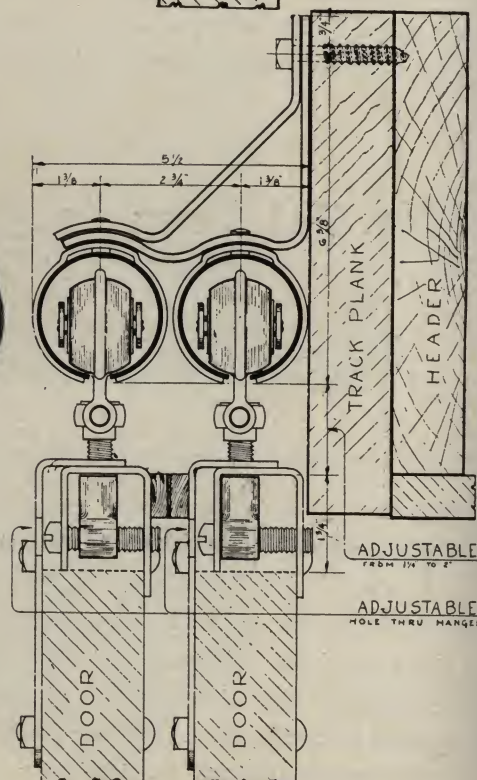
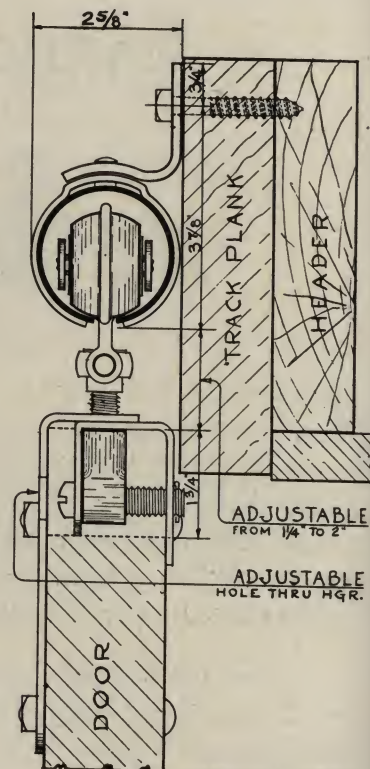


698

NO. 696 Cannon Ball Double Splice Bracket is made of two splices. Rivets which fasten the brace to the splices project $\frac{3}{8}$ of an inch inside the splice engaging slots in ends of track sections. This prevents the sections from turning and keeps the track in perfect alignment. Weight per dozen, 40 pounds.

No. 803 Cannon Ball Double Intermediate Bracket constructed like the No. 696 Cannon Ball Double Splice Bracket, except that the two sleeves are so shaped that the rivet heads clear the top of the track, permitting the bracket to be located any place where additional support between the joints is required. Weight per dozen, 40 pounds.

No. 698 Cannon Ball Double End Bracket supports the end of two parallel lines of Cannon Ball Track. It closes the ends of the tracks, making them bird-proof, and acts as a stop for the hangers. Weight per dozen, 15 pounds.



Cannon Ball Track Brackets

Cross Ear Ceiling Brackets for Single Track

With holes for $\frac{3}{8}$ in. lag screws



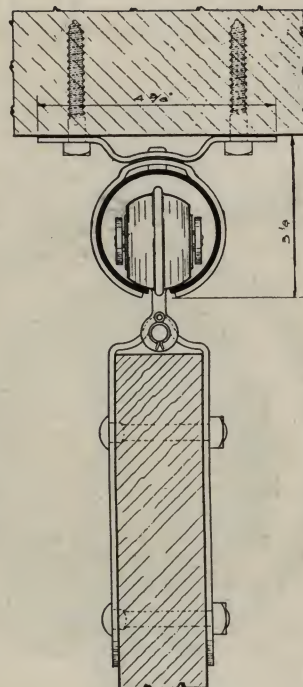
1055



1056



1059



NO. 1055 Cross Ear Splice Bracket. Used to join Cannon Ball sections of any length and support them from the ceiling. Rivets which fasten ears or bracket to splice engage slots in the ends of track sections. This prevents sections of track from turning in the splice. Packed two dozen in crate, weight, 23 pounds; four dozen in crate, 45 pounds.

No. 1056 Cross Ear Intermediate Bracket. Used between joints where additional support is required to hang Cannon Ball Track from the ceiling. Rivets inside the bracket clear the top of the track. This permits the bracket to be slipped into any position along the track. Packed two dozen in crate, weight, 23 pounds; four dozen in crate, 45 pounds.

No. 1059 Ceiling End Bracket is used at each end of Cannon Ball Track hung from the ceiling. They support and close the end of the track and act as a stop for the hanger. Packed one dozen in crate, weight, 8 pounds; two dozen in crate, 16 pounds.

Parallel Ear Ceiling Brackets for Single or Double Track

With holes for $\frac{3}{8}$ in. lag screws



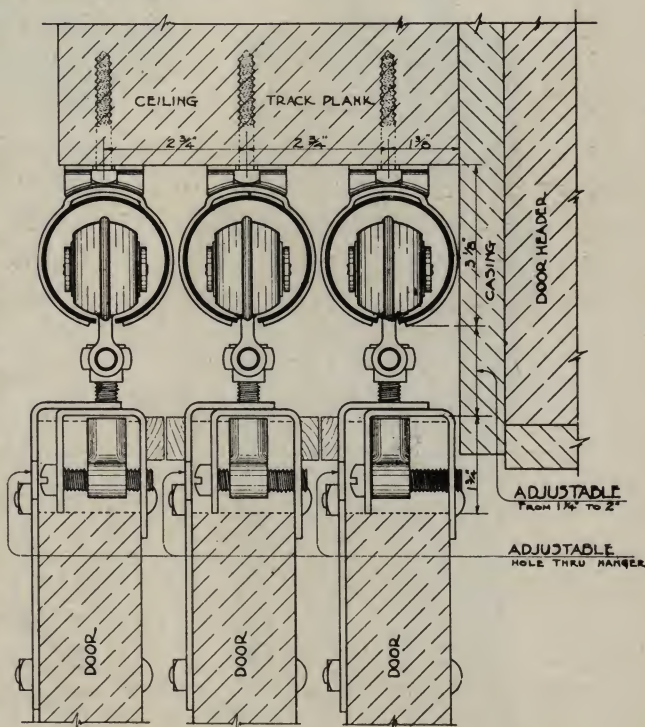
1057



1058



1059



NO. 1057 Parallel Ear Splice Bracket joins Cannon Ball sections of any length. The rivets which fasten bracket to the splice extend through the splice. They engage slots in the ends of the track which meet within the splice. Prevent the track from turning and make it line up perfectly at the joint. Packed two dozen in crate, weight, 23 pounds; four dozen in crate, 45 pounds.

No. 1058 Parallel Ear Intermediate Bracket supports track between joints. Band so shaped that inside rivet heads clear top of track. This permits the bracket to be slipped into any location along the track. Packed two dozen in crate, weight, 23 pounds; four dozen in crate, 45 pounds.

No. 1059 End Bracket is used at each end of Cannon Ball Track hung from the ceiling. They support and close the end of the track and act as a support for the hanger. Packed one dozen in crate, weight, 8 pounds; two dozen in crate, 16 pounds.

With Parallel Ear Brackets as many parallel lines of Cannon Ball Track as desired can be used, spaced as close as $2\frac{3}{4}$ inches on center.

No. 777 Weatherstrip Cannon Ball Track

Extra Heavy 13-Gauge Track for Doors Weighing Up to 400 Lbs.

THE Weatherstrip Cannon Ball is regular Cannon Ball plus the continuous weatherstrip riveted to the top of the track.

This weatherstrip forms a continuous bracket, making a one-piece track and eliminating the use of separate brackets like those described on preceding pages.

The track completely encloses the working parts of the hangers, protecting them from the weather and an oil hole in each length of track allows the hangers to be oiled without taking them down.

Every piece of track has a notch in each end. This notch slips over a rivet head inside the splice keeping the track locked in line and preventing it from turning and twisting.

The track proper is made of 13-gauge high carbon steel. Being bent on a single radius without any kinks or sharp bends, it can be made of the stiffest kind of steel.

The hanger slot is in the bottom of the track so that rust, dust, scale, and other matter can not pile up inside the track to interfere with the operation of the hangers.

The track gives the round ball wheels of the Cannon Ball hangers an even bearing on both sides of the slot so that the doors run evenly and easily even though the building sags, warps, or settles.

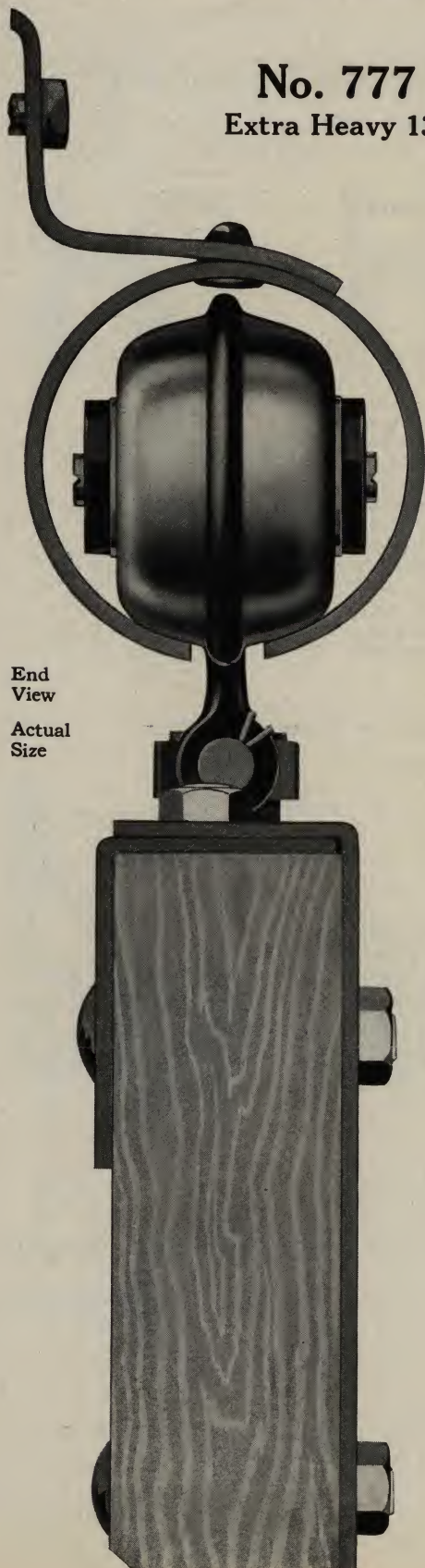
The continuous weatherstrip provides a solid connection between the building and the track and prevents rain, sleet, and snow from getting behind the door from above.

Everything (Except Track) in One Box With Hangers

The hangers, bolts, end brackets, and everything that is needed with the exception of the track and splices are packed in a box complete. Lag screws are packed with the track.

End
View

Actual
Size



No. 777 Weatherstrip Cannon Ball Track

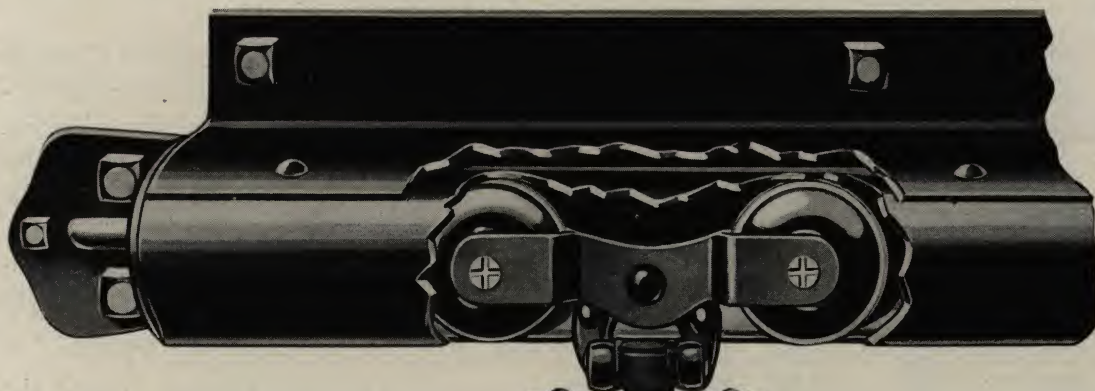


Fig. 959

Splices furnished free with
Weatherstrip Cannon Ball track
(Not necessary to specify.)

Weight 3 Pounds Per Foot



Fig 777 shows the No. EL-1068 Cannon Ball hanger
with lateral and vertical adjustment used with
No. 777 Weatherstrip Cannon Ball track. It can
also be used with No. EL-384 Cannon Ball hangers
described on page 228.



Fig. 680

End Bracket

Included in box with hangers.

Furnished in Assorted Lengths
(Lag Screws and Splices Included)

No. 777 Weatherstrip Cannon Ball track is furnished in 4-foot, 6-foot, and 8-foot
lengths. Weight 300 pounds per hundred feet.

Finished in black japan. Packed as follows:

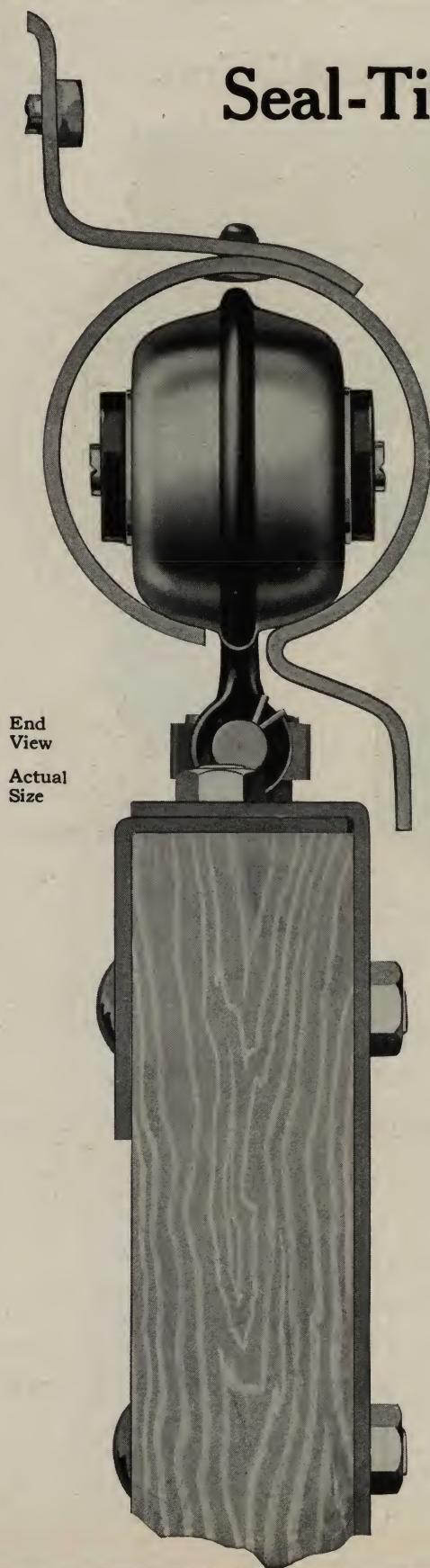
The 4 ft. track is packed 32 ft. per crate

The 6 ft. track is packed 48 ft. per crate

The 8 ft. track is packed 64 ft. per crate

Fig. 680 End Track Bracket to close up end of track and included in the boxes
with hangers No. EL-1068 and No. EL-384.

Seal-Tite Cannon Ball Track



End
View

Actual
Size

SEAL-TITE Cannon Ball Track is Cannon Ball Track—plus the popular weatherproof feature as indicated by the life-size sectional view on this page. There is a solid connection between the building and the track. This supports the track and effectively closes the gap between the track and the building. It is impossible for rain, sleet or snow to get behind the door from above.

The flange or apron extends from the underside of the track reaching out beyond the door and below the top of the door. It prevents storms from blowing into the building between the track and the door. In addition to the weatherproof features described above, Seal-Tite Cannon Ball Track embraces all of the mechanical perfection of Cannon Ball Track shown on the preceding pages. It is weatherproof and bird-proof. It is also self-cleaning. Rust, dirt, dust and moisture naturally shake out through the slot which is in the bottom of the track. They cannot accumulate and pile up to impede the operation of the hanger.

All Regular Cannon Ball Hangers Operate in Seal-Tite Track

On the opposite page is shown a cutaway view of Seal-Tite Track with the No. 1068 Door Hanger. In a like manner all of the hangers shown on the preceding pages will operate in Seal-Tite Cannon Ball Track.

The Seal-Tite Cannon Ball Track is kept in perfect alignment at the joints by means of a collar or splice shown in Fig. 959 and altho no end bracket is necessary the No. 680 Cannon Ball end bracket is used with Seal-Tite Track merely to close the opening at the end.

No. 933 Seal-Tite Cannon Ball Track

Clearance between Track and Door, $\frac{3}{8}$ inch

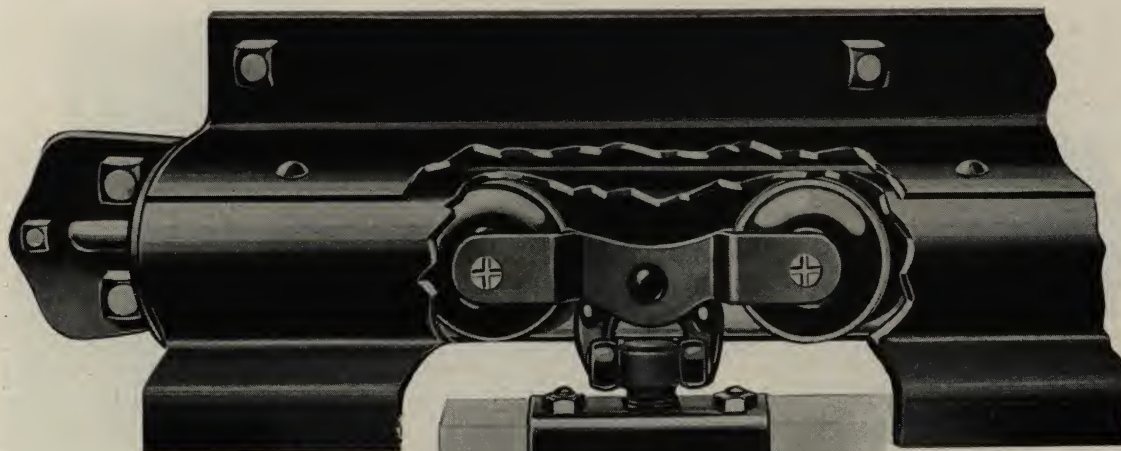


Fig. 959

Splices furnished free with Seal-Tite Cannon Ball Track. (Not necessary to specify.)

Weight $3\frac{1}{2}$ Pounds Per Foot



Fig. 938



Fig. 680
End Bracket

Should be specified when ordering

Fig. 938 shows the regular No. 1068 Cannon Ball Hanger with lateral adjustment used in connection with the Seal-Tite Cannon Ball Track. Also Used with Hangers on Pages 227-228.

Furnished in Assorted Lengths (Lag Screws and Splices Included)



Fig. 933

No. 933 Seal-Tite Cannon Ball Track furnished in 4-foot, 6-foot and 8-foot lengths. Weight 350 pounds per hundred feet.

Finished in black japan

The 4 ft. track is packed 32 ft. per crate

The 6 ft. track is packed 48 ft. per crate

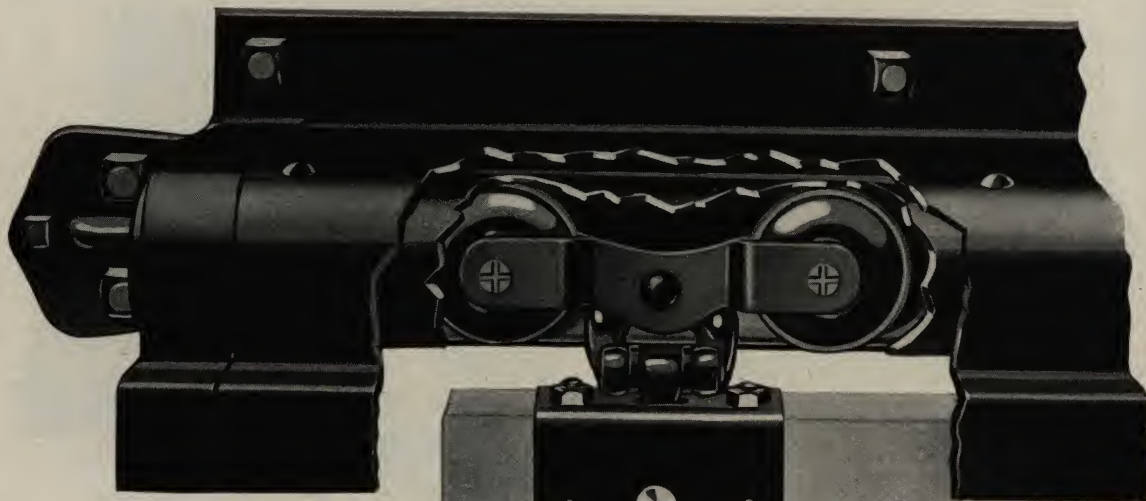
The 8 ft. track is packed 64 ft. per crate

Fig. 680 End Track Brackets to close up end of track, packed one and two dozen per crate. Weight per crate, 8 pounds and 16 pounds.



No. 651 Covered Cannon Ball Track

(Illustrated in Connection with the No. 1067 Adjustable Cannon Ball Hanger)



Clearance between Track Cover
and Two-ply Door, $\frac{3}{8}$ inch.

THE Covered Cannon Ball Track illustrated above combines all the advantages of the Standard Cannon Ball Track shown on the preceding pages. To this, add the advantage of a deep cover, which is riveted (not welded) to the track itself.

This cover is sufficient in depth so that it not merely sheds those rains which descend gently, but effectively prevents storms of snow and sleet from blowing in over the top of the door.

This cover not only gives the greatest possible measure of protection as indicated above, but acts as a support for the track, doing away with brackets.

Any of the Cannon Ball Hangers shown on the preceding pages can be used with this track.

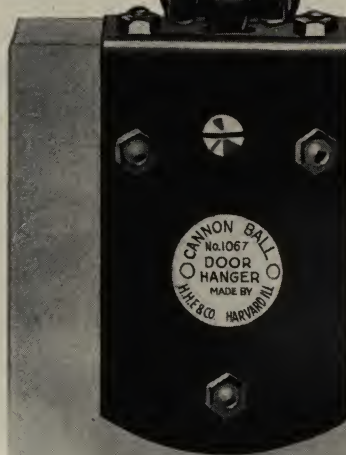


Fig. 651

Used with Hangers Shown on Pages 226-228



Fig. 685

Splices Furnished
Free with Covered
Cannon Ball
Track
(Not necessary
to specify)

Weight 4 Pounds
Per Foot

Covered Cannon Ball Track is furnished in four, six and eight-foot lengths. Four pieces of one length are packed in a crate. Weight of track is four pounds per foot. Splices included with track.

End Track Brackets are the same as those used with the regular Cannon Ball Track. No. 680 packed in crates of one and two dozen each, weighing eight pounds and sixteen pounds.

Cannon Ball Junior Door Hangers

No. 1061—Roller Bearing

For doors weighing up to 250 pounds



MACHINED wheels $1\frac{3}{8}$ inches in diameter. Ten cold rolled steel bearings, made from $\frac{1}{4}$ inch stock, running on cold rolled steel axle.

Heavy, one-piece pressed steel door strap 5 inches long, $1\frac{3}{4}$ inches wide, $\frac{1}{8}$ inch thick, punched for $\frac{5}{16}$ inch bolts, for 2 ply doors.

Finished in black japan.

Packed one pair of hangers with 4, $2\frac{1}{4} \times \frac{5}{16}$ inch bolts in paper box. Six pairs in heavy carton.

Weight per dozen pairs, 42 pounds.

Clearance between bottom of track and top of door, 1 inch.

Bottom of track to center of hole in bracket $2\frac{3}{4}$ inches.

No. 1061 Cannon Ball Junior Hanger for use with Cannon Ball Junior track illustrated on page 240.

See pages 240 and 242 for track and bracket specifications.

Cannon Ball Junior Door Hangers

No. 1082—Roller Bearing
Lateral and Vertical Adjustments
For Doors Weighing Up to 250 Pounds



MACHINED wheels $1\frac{3}{8}$ inches in diameter. Ten cold rolled steel bearings, made from $\frac{1}{4}$ inch stock, running on cold rolled steel axle.

Heavy, one-piece pressed steel door strap 6 inches long, $1\frac{3}{4}$ inches wide, $\frac{1}{8}$ inch thick, punched for $\frac{5}{16}$ inch bolts, for 2 inch doors.

Vertical adjustment permits doors to be raised or lowered at either end by turning suspension bolt which connects stirrup and door strap. Door can be set close to or farther from the building by turning lateral adjustment screw in face of door strap.

Finished in black japan.

Packed one pair of hangers with 4, $2\frac{1}{4} \times \frac{5}{16}$ inch bolts in paper box. Six pairs in heavy carton.

Weight per dozen pairs, 55 pounds.

Clearance between bottom of track and top of door, 1 inch.

Bottom of track to center of hole in bracket $2\frac{3}{4}$ inches.

No. 1082 Cannon Ball Junior Hanger for use with Cannon Ball Junior track illustrated on following pages.

See pages 240 and 242 for track and bracket specification.

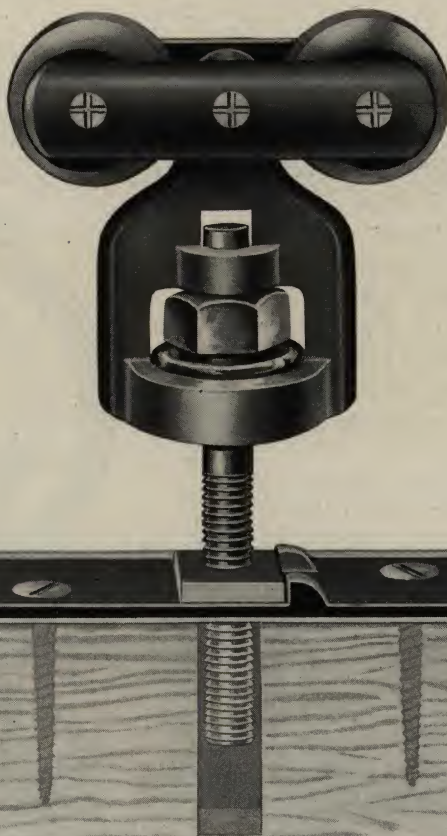
No. 1321 Cannon Ball Junior Accordion Door Hanger

Roller Bearing

Short Coupled Truck
Allows Doors to Fold
Back Flat

Truck Length Over All
3 Inches

Pendant Swivels on
Ball Bearings



Extra Long Top Plate

7 Inches Long

Makes Use With
Softwood Practical

Six 2-inch No. 11 Screws
Packed With Each
Hanger

Used with Cannon Ball Junior Track (Pages 240-241) and Ceiling Brackets (Page 242).

THIS tandem wheel hanger has a decided advantage over a single wheel hanger because it keeps level and holds the suspension bolt perpendicular and prevents the annoyance of jamming and rubbing along the under side of the track. The roller bearing ball wheels have an even bearing on both sides of the track so they always run easy even after years of wear.

Used in connection with Cannon Ball Junior Track and Ceiling Brackets shown on the pages which follow.

Each Hanger—centered in the top of a door—swivels so the doors, which are hinged to-

gether, may all be folded accordion style, to right or left or both ways from the center. Long heavy screws hold the top plate. The pendant bolt is threaded into this top plate so that a turn of this screw raises or lowers the door. The square piece of steel on top of the plate fits against the flattened side of the pendant bolt and against two lugs on top of the door plate.

This locks the bolt and prevents it from turning.

This lock is raised to clear the lugs on top of the door plate when adjustment is being made.

Cannon Ball Junior Door Track

CANNON Ball Track described on the preceding pages provides really greater strength than is necessary for the ordinary door. By forming a track $1\frac{1}{2}$ inches in diameter and using 16-gauge steel, the weight generally used in door tracks, we provide in Cannon Ball Junior door track a tubular track which is in every other respect like Cannon Ball. It is strong enough to handle most of the doors in ordinary use and sells at a lower price. Cannon Ball Junior Track is designed for handling doors of regular thicknesses weighing up to 250 pounds each.

The accompanying illustration shows how the round ball wheels conform to the shape of the track. They have an even bearing on both sides of the slot through which the door is suspended. Because this slot is at the lowest point in a perfectly round track there is no place for dirt, dust or moisture to pile up and make the hangers run hard.

No. 1088 Cannon Ball Junior Track



Fig. 1088

Like regular Cannon Ball, Cannon Ball Junior track is perfectly round. It is $1\frac{1}{2}$ " in diameter inside and is made of 16-gauge high carbon steel—the weight generally used in covered door tracks.

Cannon Ball Junior track in three-foot lengths is preferred by most carpenters and builders because it is so easy to erect.



The above illustration shows a crate of Cannon Ball Junior track in 3 ft. lengths. It consists of 32 pieces making a total of 96 ft and weighs 115 lbs.

Cannon Ball Junior track is also furnished in 4, 6 and 8 ft. lengths described on the following page.

Description of splices and brackets is also given on the page following.

Actual Size

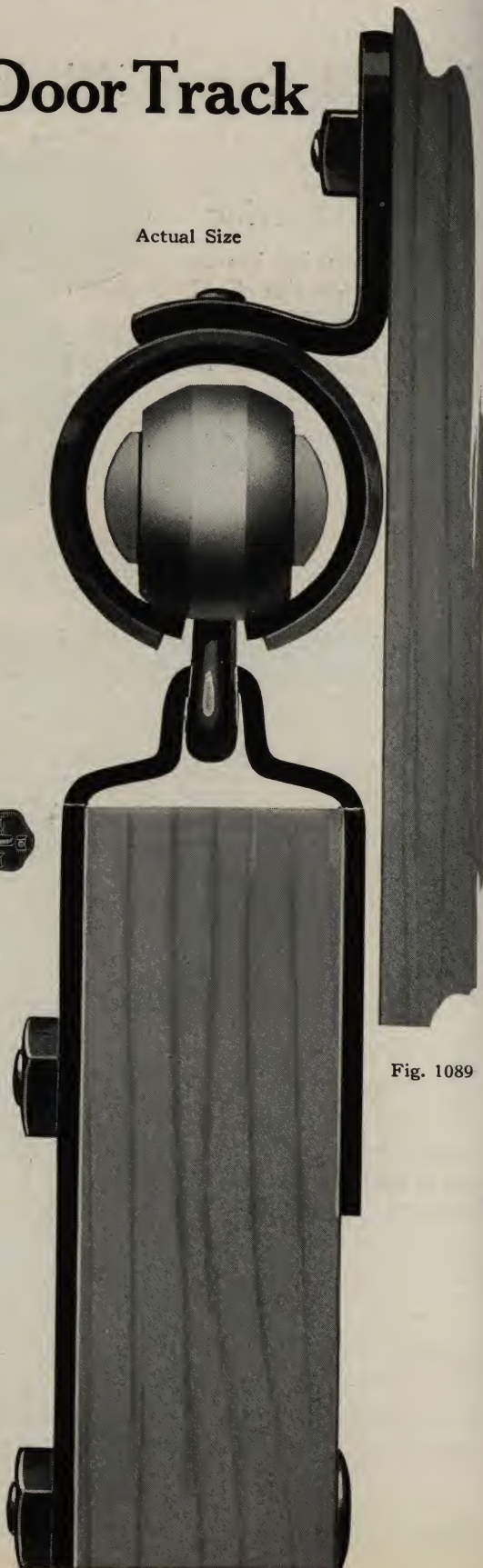


Fig. 1089

Cannon Ball Junior Door Track

(Long Lengths)



THE unusual popularity of Cannon Ball Junior Track, at first furnished only in 3 ft. lengths, has prompted the production of longer lengths of track which are now available.

Cannon Ball Junior Track in long lengths is made of 16-gauge steel and is $1\frac{1}{2}$ inches in diameter. It is connected at joints by regular splice brackets. Inter-

mediate brackets, as illustrated below and on the following page, are used to support it where necessary between the joints.

Cannon Ball Junior Track is furnished in 4, 6 and 8 ft. lengths. It is packed 100 ft. to the crate consisting of eight 8-ft., four 6-ft. and three 4-ft. lengths. A crate weighs 120 lbs.

Cannon Ball Junior Track Brackets

Side Brackets for Single Track

With holes for $\frac{5}{16}$ in. lag screws



1063



1064



1065

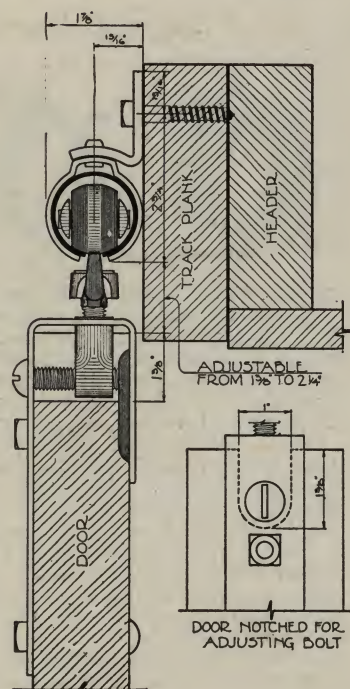
NO. 1063 Cannon Ball Junior Splice Bracket. Used to join Cannon Ball Junior sections of any length and to support the track at the joint. The rivets which fasten brackets to splice engage slots in ends of the rail sections, making a perfect joint.

Packed two dozen or four dozen to the carton of 12 pounds and 25 pounds respectively.

No. 1064 Cannon Ball Junior Intermediate Bracket. Used where necessary to support Cannon Ball Junior Track between joints. The sleeve is so shaped that the rivets which fasten it to the bracket clear the top of the track. This permits the bracket to be slipped into any position along the track.

Packed two dozen or four dozen to the carton of 12 pounds and 25 pounds respectively.

No. 1065 Cannon Ball Junior and Brackets. Used at both ends to support the track. They close the end of the track, making it bird-proof. Packed one dozen and two dozen to the carton of 5 pounds and 10 pounds respectively.

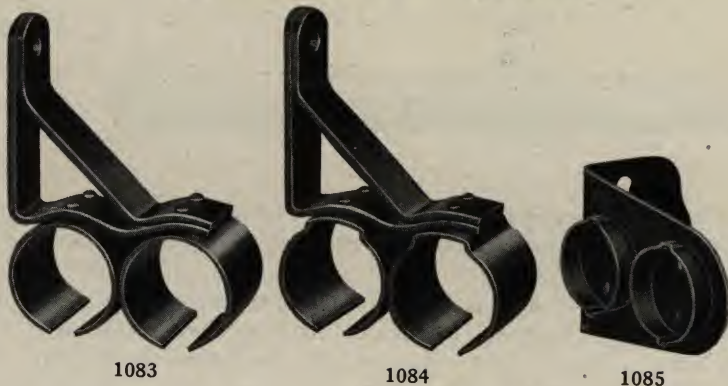




Cannon Ball Junior Track Brackets

Side Brackets for Double Track

With holes for $\frac{5}{16}$ in. lag screws



1083

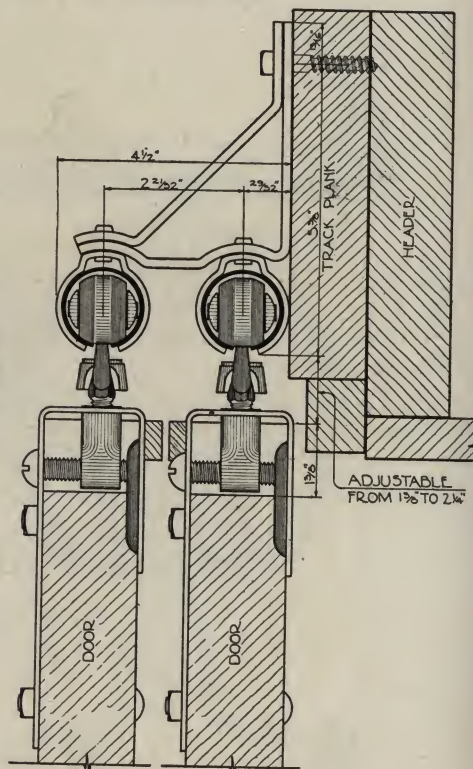
1084

1085

NO. 1083 Cannon Ball Junior Double Splice Bracket is made of two splices riveted to a brace. Rivets project inside the splice and engage slots in ends of track sections. This prevents sections from turning and keeps track in perfect alignment. Weight per dozen, 25 pounds.

No. 1084 Cannon Ball Junior Double Intermediate Bracket. Constructed like the No. 1083, except that the two sleeves are so shaped that the rivets clear the top of the track. This permits bracket to be slipped into any desired place where support between joints is desired. Weight per dozen, 16 pounds.

No. 1085 Cannon Ball Junior Double End Bracket supports the end of two parallel lines of Cannon Ball Track. It closes the ends of the tracks, making them bird-proof and acts as a stop for the hangers. Weight per dozen, 8 pounds.



Parallel Ear Ceiling Brackets for Single or Double Track

With holes for $\frac{5}{16}$ in. lag screws



1112

1113

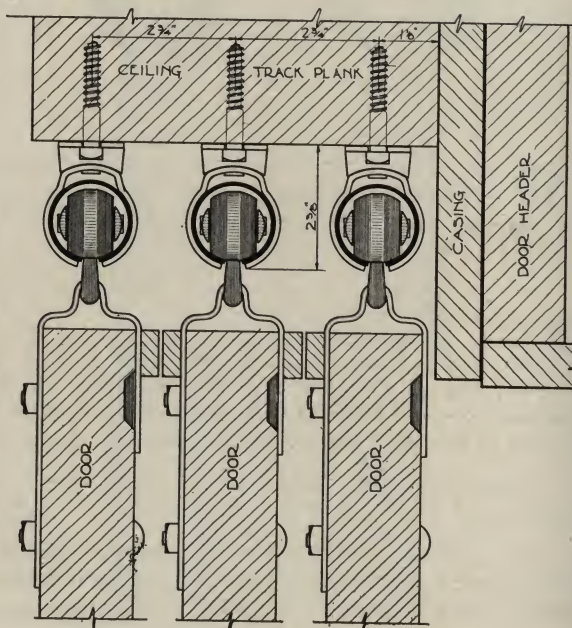
1111

NO. 1112 Parallel Ear Splice Bracket joins Cannon Ball Junior sections of any length. The rivets which fasten bracket to the splice extend through the splice. They engage slots in the ends of the track which meet within the splice. Prevent the track from turning and make it line up perfectly at the joint. Packed two dozen in carton, weight 12 pounds; four dozen in carton, 25 pounds.

No. 1113 Parallel Ear Intermediate Bracket supports track between joints. Band so shaped that inside rivet heads clear top of track. This permits the bracket to be slipped into any location along the track. Packed two dozen in carton, weight 12 pounds; four doz. in carton, 25 pounds.

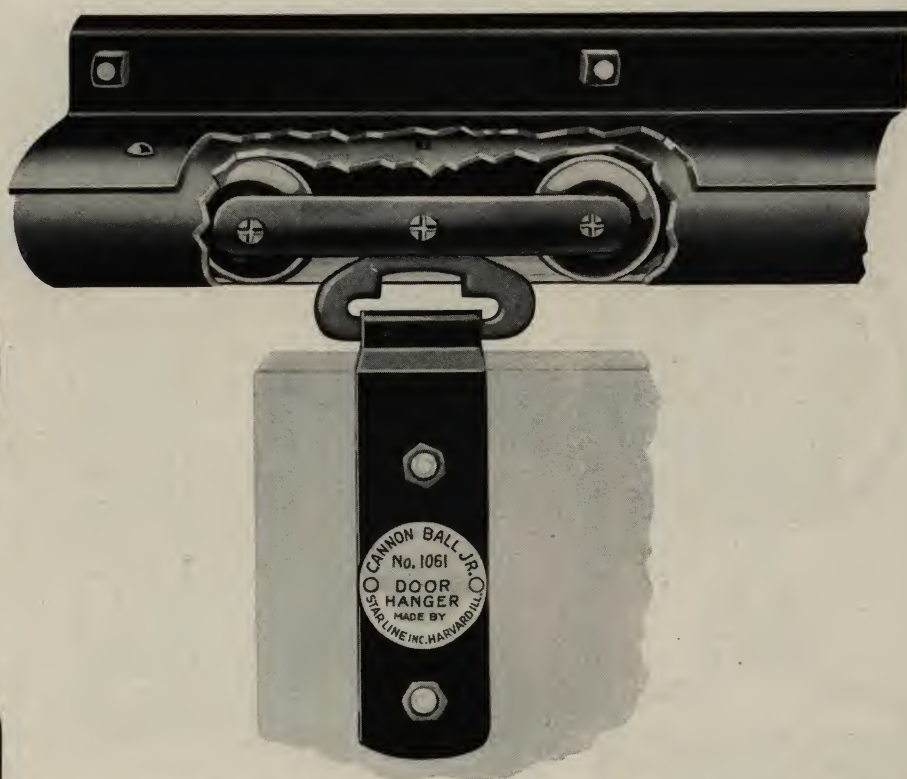
No. 1111 End Bracket is used at each end of Cannon Ball Junior Track from the ceiling. They support and close the end of the track and act as a support for the hanger. Packed one dozen in carton, weight 8 pounds; two dozen in carton, 16 pounds.

With Parallel Ear Brackets as many parallel lines of Cannon Ball Junior track as desired can be used, spaced as close as $2\frac{3}{4}$ " on center.



No. 555 Weatherstrip Cannon Ball Track

16-Gauge Track for Doors Weighing Up to 250 Lbs. Each



NO. 555 TRACK is the regular Cannon Ball Junior Track described on the preceding pages with the addition of a weatherstrip continuous bracket riveted to the top. The hanger slot is in the bottom of the track. There is no gutter or groove for dirt and dust to pile up and stop the wheels because it works out through the slot in the bottom. An oil hole in each length of track allows the hangers to be oiled without taking them down. Both ends of every piece of track are notched to fit a rivet head inside the splice sleeve. This prevents track from turning and twisting and keeps it locked in line.

Everything (But Track) Comes in One Box

Bolts and End Stops are packed with the No. EL-1061 hangers illustrated above. Splices and lag screws are included with the track.

No. 555 Weatherstrip Cannon Ball weighs $1\frac{3}{4}$ lbs. to the foot. It is finished in black japan and packed as follows:

The 4-ft. track is packed 32 ft. per crate.

The 6-ft. track is packed 48 ft. per crate.

The 8-ft. track is packed 64 ft. per crate.

No. 666 Covered Cannon Ball Junior Track



NO. 666 TRACK has a deep heavy storm cover riveted to the top of the regular Cannon Ball Junior track.

This storm cover comes down well below the top of the door not merely to throw rain away from the building but to prevent storms from blowing in over the top of the door.

Everything (Except Track) Comes in One Box

With each pair of No. EL-1061 hangers illustrated above in connection with Covered Cannon Ball Junior track are packed one pair of end stops for use at the ends of the track and the necessary bolts.

No. 666 Covered Cannon Ball Junior track comes in 4-ft., 6-ft. and 8-ft. lengths. It is finished in black japan and weighs $2\frac{3}{4}$ lbs. per foot, packed as follows:

- 4-ft. track, 32 ft. per crate
- 6-ft. track, 48 ft. per crate
- 8-ft. track, 64 ft. per crate

The necessary splices and lag screws are included with the track.

No. 845 Weatherproof Hangers

THE Weatherproof Tandem Door Hanger shown in Fig. 845 is practically noiseless and frictionless.

The wheels have roller bearings as shown in Fig. 571 and they run in a roomy groove. The tandem truck holds the wheels in alignment and prevents them from sticking or binding.

Packed one pair in a box including end brackets and bolts; six pairs in a carton. Weight per dozen pairs, 80 lbs.

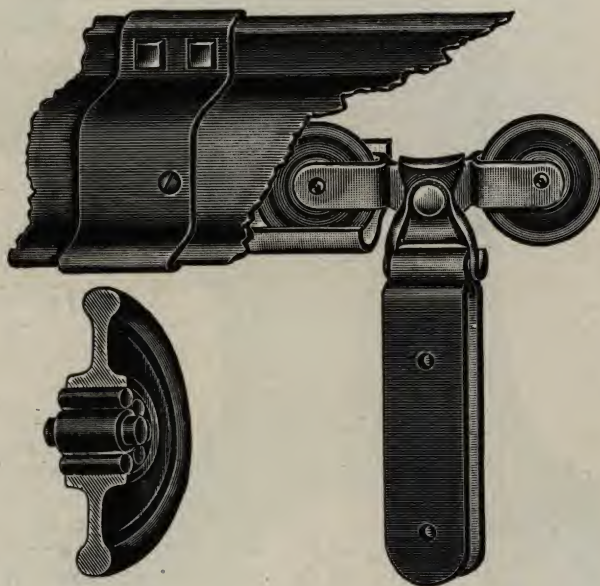


Fig. 571

Sectional View of Wheel
Showing Roller Bearings

Fig. 845

No. 847 Weatherproof Track

This track is all that its name implies. The deep cover affords a shelter that protects the track, brackets, and hangers from weather. It comes down below the top of the door to keep rain, sleet and snow from entering the building.

The cover can not sag and rub on the hangers because it is independent of the track itself. It has no weight to hold up, the track being supported by good strong brackets.

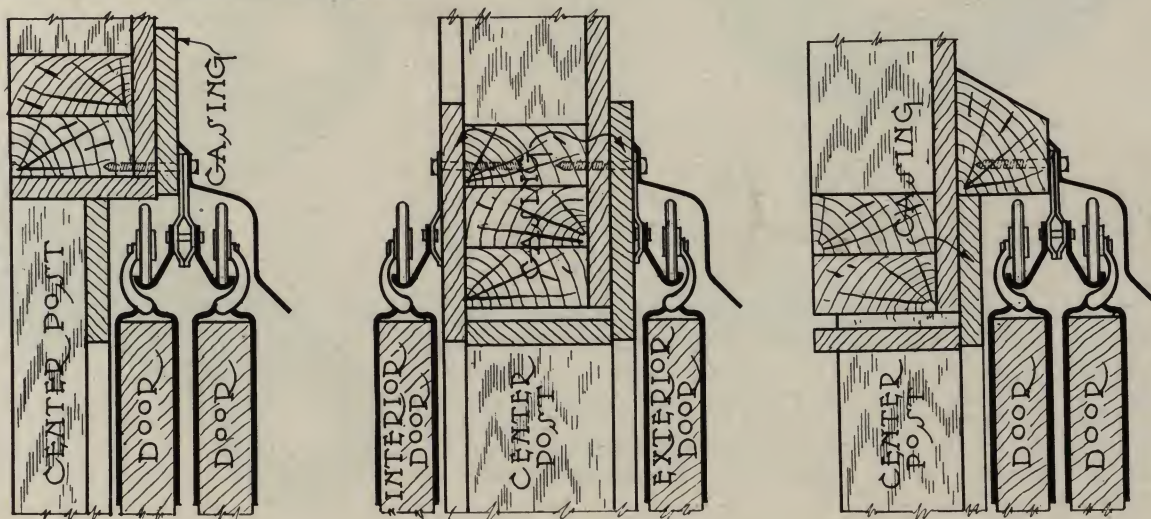
The track can not be thrown out of line at the joints because a lip or projection from the end of one piece of track fits through a notch in the end of the next section.

Track comes in 4-ft., 6-ft., and 8-ft. lengths. It is packed in bundles of two sections of track and cover of the same length.

The track is finished in black japan. Weight per foot, $2\frac{1}{4}$ lbs. End track brackets are packed with hangers.

Track only without the cover or cover only without the track may be had separately, if desired.

In the three diagrams below are shown three working applications of weatherproof track in connection with parallel sliding doors.





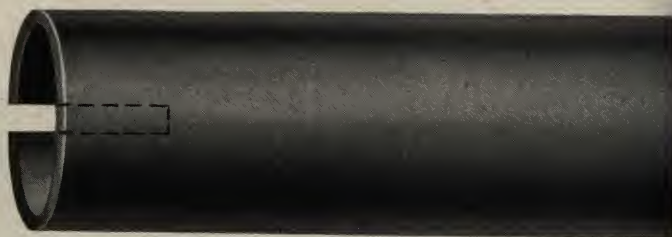
No. 30 Twentieth Century Track

1 1/8" in diameter.
Two foot lengths make this track easy to erect. They also make it impossible to erect the track without a sufficient number of supporting brackets.

The ends being slotted the track is spliced from within, bringing together the ends of the track in a perfectly smooth, even joint. Finished in battleship gray. Crates of 100 ft. weigh 120 lbs.

No. 42 End Bracket for Twentieth Century Track is made of heavy malleable iron. Packed with hangers.

Actual Size



No. 28 Twentieth Century Door Hanger

Roller Bearing for Round Track

This hanger has both frame and hood of one heavy malleable piece. Although rigid it operates on round track and offers the same flexibility as a hinged hanger. Lip extending out from the hanger below the track prevents it from jumping off. An oil hole in front of the hood or frame makes it easy to oil the bearings. Finished in gray enamel trimmed with red. One pair in box with bolts and brackets. Six pairs to the case. Weight per dozen pairs, 75 lbs.





Fig. 397

Flexo Door Hangers

Roller Bearing

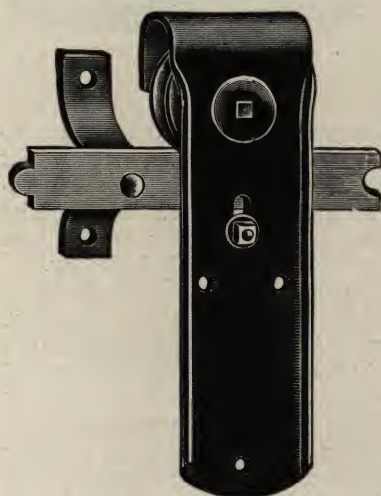
No. 397 Single Wheel Flexo Hanger packed one pair in a box, complete with bolts. One dozen pairs to wooden case. Weight, per dozen pairs, 65 lbs.

No. 949 Flexo Tandem Hanger with lateral and vertical adjustment. Packed one pair complete with bolts in a paste-board box. One dozen pairs in wooden case weighing 110 lbs.



Fig. 949

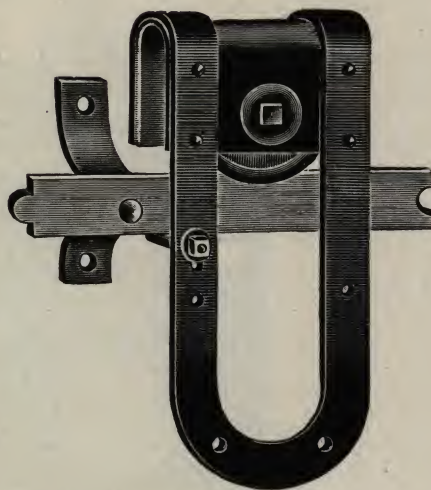
Flexo
Hanger
Lateral
and verti-
cal ad-
justments



No. 5

No. 5 Star Roller Bearing Hanger runs on any flat track from 1 in. to 1½ in. deep. Roller bearing wheel is 3¼ in. diameter. Door strap ½ in. thick, 3½ in. wide, 12 in. long. Packed ½ dozen pair in a crate. Weight, dozen pairs, 75 lbs.

No. 10 Star Roller Bearing Hanger runs on any flat track 1 in. to 1½ in. deep. 3¼ in. wheel. Door strap and hood 12 in. high. Packed ½ dozen pair in crate. Weight, per dozen pairs, 84 lbs.



No. 10

No. 160 Flexo Door Track

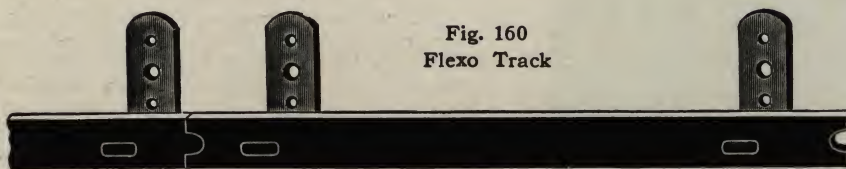


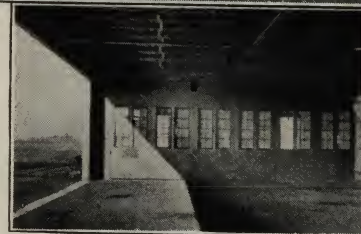
Fig. 160
Flexo Track

No. 160 Flexo Door Track used with Flexo Door Hangers, is made of high carbon steel, $\frac{3}{16}$ x $1\frac{1}{4}$ in., furnished in 6, 8 and 10 ft. lengths.

Weight, per 100 ft., 105 lbs.



Door Fixtures For Airplane Hangar Doors



THE only part of an airplane hangar that has to be operated is the doors. On account of their height and size swinging doors have proven impractical because they catch too much wind. The same objection applies to those doors which are operated on a straight track outside the building.

The most practical way of handling the doors is to run them around the corner, inside the building, where the doors, when open, hang flat against the side walls taking up only the amount of space required by their own thickness.

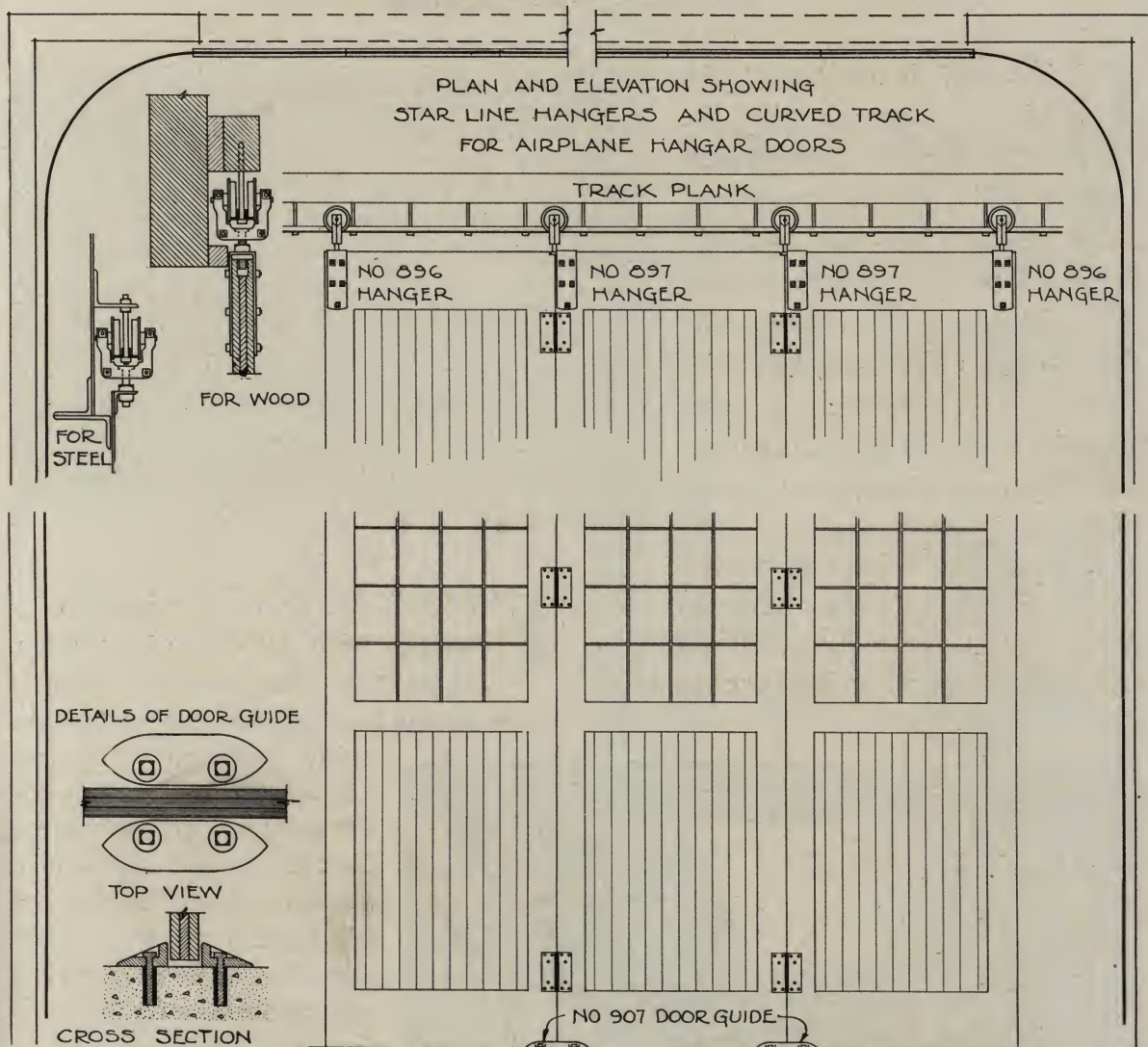
Ordinary door hangers used in this manner have involved the use of bottom rollers running on a track and this track obstructed the easy handling of the planes in and out of the hangar.

Star Airplane Door Hangers are an adaptation of heavy commercial trolley conveyors. From the trolley a heavy steel double door strap $10\frac{1}{4}$ in. long, 4 in. wide, $\frac{3}{16}$ in. thick and adjustable to the thickness of the door is suspended from the trolley by a $\frac{3}{4}$ in. bolt.

The trolley operates on a $2\frac{1}{2}$ in. double angle track supported at intervals of 1 foot. The track supports are adjustable so the track may be leveled up perfectly at any time for the easy operation of the heavy doors. Hangers made in 4 sizes as follows:

No.	Capacity
894 Standard Hangar-Door Trolleys for end door.....	500 lbs.
895 Standard Hangar-Door Trolleys for center door.....	500 lbs.
896 Heavy Hangar-Door Trolleys for end door.....	700 lbs.
897 Heavy Hangar-Door Trolleys for center door.....	700 lbs.
898 Extra Heavy Hangar-Door Trolleys for end door.....	1,000 lbs.
899 Extra Heavy Hangar-Door Trolleys for center door.....	1,000 lbs.
908 Ball Bearing Extra Heavy Hangar-Door Trolleys for end door.....	1,000 lbs.
909 Ball Bearing Extra Heavy Hangar-Door Trolleys for center door.....	1,000 lbs.

Method of Hanging Hangar Doors



THE accompanying drawings show the manner in which the track and doors are arranged to make the entire front of the hangar into an opening without running the doors out where they are exposed to wind damage and without the use of a floor track.

The plan shows a 4-foot return from the side walls toward the center or opening but even this can be omitted and replaced by a swinging door that swings back under the track and hangs flat against the side wall while open.

This swinging door can be hinged to the adjacent sliding door or to the side of the opening as preferred.

RIGID DOUBLE ANGLE TRACK

Track is $2\frac{1}{2}$ in. wide supported at intervals of 1 ft. from track plank as shown or by using hangers with bolt threads at the top end that can be suspended from the

horizontal part of steel angles, channels or I-beams which form a part of the building frame. The hangers regularly furnished are $10\frac{1}{4}$ inches long. Longer hangers can be furnished if desired. The standard track curves are bent on a 4 ft. radius. Smaller curves can be furnished but the full size curves render the operation of the heavy doors much easier.

No. 907 DOOR GUIDE HOLDS DOORS IN PLACE

No. 907 Door Guide shown in the drawing is anchored in concrete. It holds the bottom of the door firmly so that they are not bothered by wind.

Cane Bolts can be furnished if desired but the door guides are recommended because they are always in place and there is no danger of anyone forgetting to operate them; they require no attention.



Cannon Ball Combination Garage Door Equipment

(Folding-Sliding—Continued)

IN Fig. 787 is illustrated the inside of a garage with the doors closed and the complete Cannon Ball Combination Garage Set in view. Note how perfectly the doors fit the opening, making it weather-tight. The door to the right swings independently of the other two, permitting an easy entrance to or exit from the garage—a great convenience at all times, especially in cold weather. The two spring door bolts, one located at the top, the other at the bottom, at the center of the folding-sliding doors, lock them securely and keep the entrance weather-tight.

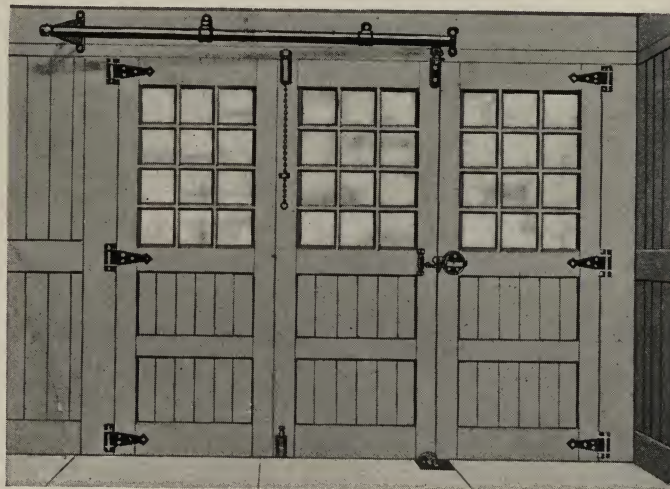


Fig. 787

FIGURE 786 shows the inside of a garage with all the doors open.

Note that the private entrance door swings back against the wall at the right. Also that the two folding-sliding doors on the left roll back on our special Garage Hanger running in Cannon Ball Track, and fold against the wall, where they lie flat, occupying only the space required by their own thickness.

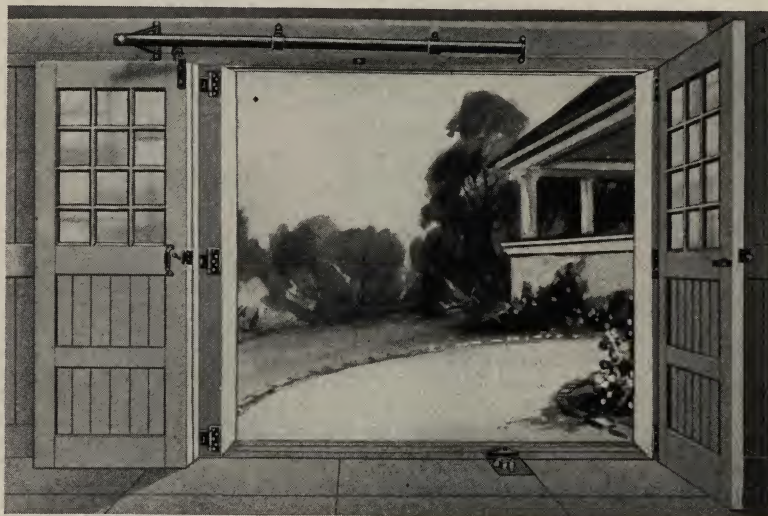


Fig. 786

When the doors are folded back against the wall, the spring in the bracket holds them securely, regardless of their thickness. Offset hinges (furnished with complete set of fixtures) set the doors back when open and leave the opening absolutely clear.

They are held in this position by our patented Spring Bracket which supports the track at the end, as shown in the illustration.

No. 800 Cannon Ball Combination Garage Door Set

For Three Folding-Sliding Doors

FIG. 800 shows a complete set for three garage doors, including Cannon Ball Track, the hangers and other necessary fixtures to complete the installation.

With the exception of the 64-inch piece of Cannon Ball Track, all of these fixtures are, for convenience, packed in a box.

The set as illustrated contains the following:

- 1 piece of Cannon Ball Track 64-inches long.
- 1 piece of Cannon Ball Track 23 inches long.
- 1 No. 1204 Cannon Ball Latch.
- 1 Spring Supporting Bracket, No. 788.
- 1 No. 789 Floor Guide.
- 1 No. 802 Cannon Ball Garage Hanger.
- 1 No. 1075 Splice Bracket.
- 1 No. 1076 Intermediate Supporting Bracket.
- 6 No. 1077 10-inch Offset T Hinges.
- 3 No. 1078 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 1 No. 1081 Hand Pull.
- 1 No. 1097 End Bracket.



Fig. 800

Necessary Screws, Lags and Bolts for Installation.

Everything except long length of track packed in a box weighing 50 lbs.

For More Than Three Doors

For the convenience of those desiring to use similar fixtures in openings where there

are four, five or six doors, sets similar to that illustrated above have been provided.

Parts May Be Purchased Separately

Any of the pieces or parts shown in the illustration above may be purchased separately

so that it is not necessary to buy the complete set where all the fixtures are not required.

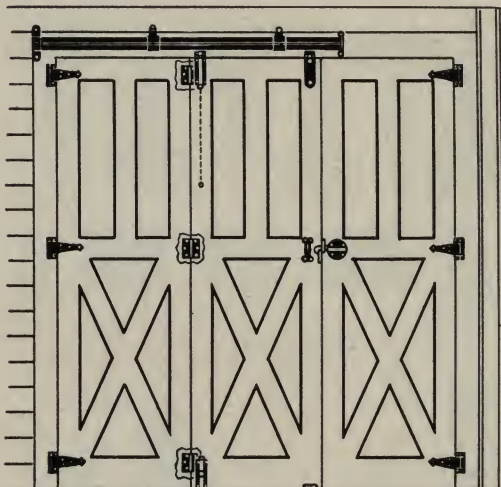
For Wider Doors

By using a longer piece of track than that illustrated and described, the above set can be used for wider openings. To determine length

of track required add 10 inches to the combined width of the two doors which operate on the track.

Cannon Ball Fixtures for Folding-Sliding Doors

No. 800 Cannon Ball Garage Door Set



For three doors each 2'6" to 3'0" wide in door openings from 7'6" to 9'0" wide.

- 1 piece of Cannon Ball Track 64 inches long.
- 1 piece of Cannon Ball Track 23 inches long.
- 1 Spring Supporting Bracket, No. 788.
- 1 No. 1204 Cannon Ball Latch.
- 1 No. 789 Floor Guide.
- 1 No. 802 Cannon Ball Garage Hanger.
- 1 No. 1075 Splice Bracket.
- 1 No. 1076 Intermediate Supporting Bracket.
- 6 No. 1077 10-inch Offset T. Hinges.
- 3 No. 1078 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 1 No. 1081 Hand Pull.
- 1 No. 1097 End Bracket.

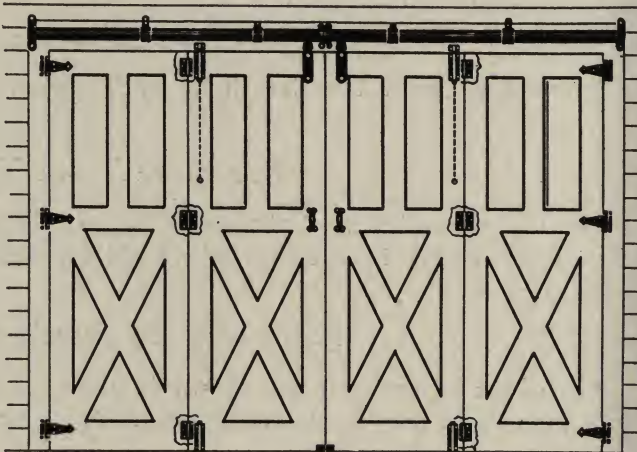
Necessary Screws, Lags and Bolts for Installation.

Everything except long piece of track packed in a box complete. Weight 50 pounds.

No. 864A Cannon Ball Garage Door Set

For four doors each 2'6" to 3'0" wide in openings 10'0" to 12'0" wide.

- 2 pieces Cannon Ball Track 64 inches long.
- 2 pieces Cannon Ball Track 23 inches long.
- 2 No. 1097 End Brackets.
- 2 No. 788 Spring Supporting Brackets.
- 1 No. 789A Floor Guide.
- 2 No. 715S Cannon Ball Garage Hangers.
- 2 No. 1075 Supporting Splice Brackets.
- 2 No. 1076 Intermediate Supporting Brackets
- 6 No. 1077 10-inch Offset T. Hinges.
- 6 No. 1078 4-inch Offset Surface Hinges.
- 2 No. 1079 Chain Bolts.
- 2 No. 1080 Foot Bolts.
- 2 No. 1081 Hand Pulls.



Necessary Screws, Lags and Bolts for installation.

Everything except 2 long pieces of track packed in a box complete. Weight 65 pounds.

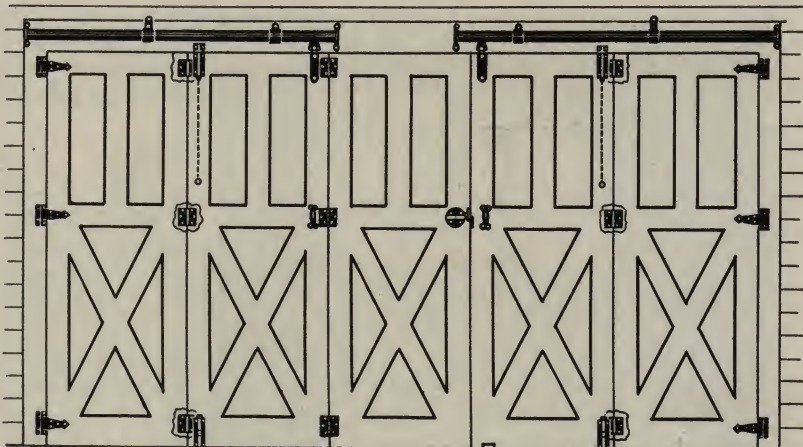
All fixtures mentioned above are illustrated and described on page 251 and may be purchased separately as well as in combination sets.

Cannon Ball Fixtures for Rolling-Folding Doors

No. 865 Cannon Ball Garage Door Set

For five doors each 2'6" to 3'0" wide in openings 12'6" to 15'0" wide.

- 2 pieces Cannon Ball Track
64 inches long.
- 2 pieces Cannon Ball Track
23 inches long.
- 2 No. 1097 End Brackets.
- 1 No. 1204 Cannon Ball
Latch.
- 2 No. 788 Spring Supporting
Brackets.
- 1 No. 789 Floor Guide.
- 2 No. 802 Cannon Ball
Garage Hangers.
- 2 No. 1075 Supporting
Splice Brackets.
- 2 No. 1076 Intermediate
Supporting Brackets.
- 6 No. 1077 10-inch Offset
T. Hinges.
- 9 No. 1078 4-inch Offset
Surface Hinges.



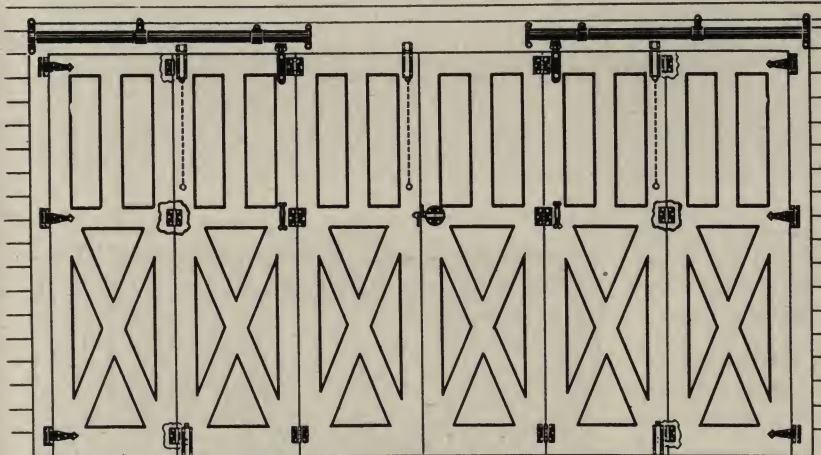
- 2 No. 1079 Chain Bolts.
- 2 No. 1080 Foot Bolts.

- 2 No. 1081 Hand Pulls.

Necessary Screws, Lags and Bolts for Installation. Everything except 2 long pieces of track packed in a box complete. Weight 75 pounds.

No. 866 Cannon Ball Garage Door Set

For six doors each 2'6" to 3'0" wide in openings 15'0" to 18'0" wide.



- 2 pieces Cannon Ball Track
64 inches long.
- 2 pieces Cannon Ball Track
23 inches long.
- 2 No. 1097 End Brackets.
- 1 No. 1204 Cannon Ball Latch.
- 2 No. 788 Spring Supporting
Brackets.
- 2 No. 802 Cannon Ball Garage
Hangers.
- 2 No. 1075 Supporting Splice
Brackets.
- 2 No. 1076 Intermediate Sup-
porting Brackets.
- 6 No. 1077 10-inch Offset T.
Hinges.
- 12 No. 1078 4-inch Offset
Surface Hinges.

- 3 No. 1079 Chain Bolts.

- 3 No. 1080 Foot Bolts.

- 2 No. 1081 Hand Pulls.

Necessary Screws, Lags and Bolts for Installation. Everything except 2 long pieces of track packed in a box complete. Weight 80 pounds.

All fixtures mentioned above are illustrated and described on page 251 and may be purchased separately as well as in combination sets.



No. 1093 Cannon Ball Come-packed Garage Door Fixtures

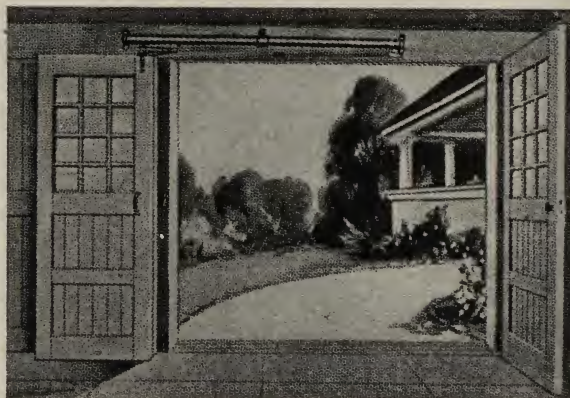
Track Lies Flat Against the Building



THERE is no nicer way to close the front of a garage than with folding-sliding doors which provide the easy operation of sliding doors with the tight-closing feature of folding doors.

Track Lies Flat Against Building

With the Cannon Ball Come-packed fixtures the door track lies flat against the building. Any Cannon Ball Track can be used with this installation. All that is needed is the special No. 1090 Cannon Ball Extension Arm Hanger which may be purchased separately and the balance of the fixtures selected from the stock of any good hardware dealer, but for convenience of those who prefer it, complete sets of fixtures are packed in a box.



No. 1093 Cannon Ball Come-packed Garage Door Set

Track Lies Flat Against the Building

This set is designed for three doors, 2'6" to 3'0" wide in openings 7'6" to 9'0" wide.

The set contains:

- 2 pieces Cannon Ball Track 40 inches long.
- 1 No. 682 Splice Bracket.
- 1 No. 789 Floor Guide.
- 6 No. 1077 10-inch Offset T. Hinges.
- 3 No. 1078 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 2 No. 1081 Hand Pulls.
- 1 No. 1090 Cannon Ball Extension Arm Hanger.
- 1 No. 1092 Hanger Stop.
- 2 No. 1097 Special Cannon Ball End Brackets.
- 1 No. 1098 Spring Hanger Cushion.
- 1 No. 1099 Top Holder.
- 1 No. 1204 Cannon Ball Latch.

Complete bolts and screws for the set.

All fixtures and track packed in a box complete.

Weight per set 65 lbs.

For More Than Three Doors

Sets of Fixtures, including track, packed complete in boxes for four, five and six doors and illustrated on the pages following.

Can Be Installed Outside

Fixtures of the type illustrated herewith can be installed outside the building without disfiguring the front of it as the track lies flat against the building—does not project out from it.

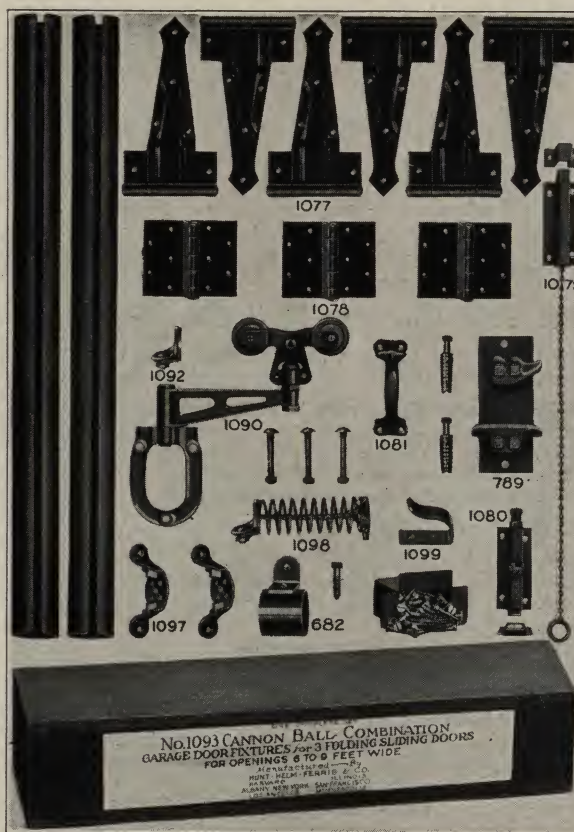
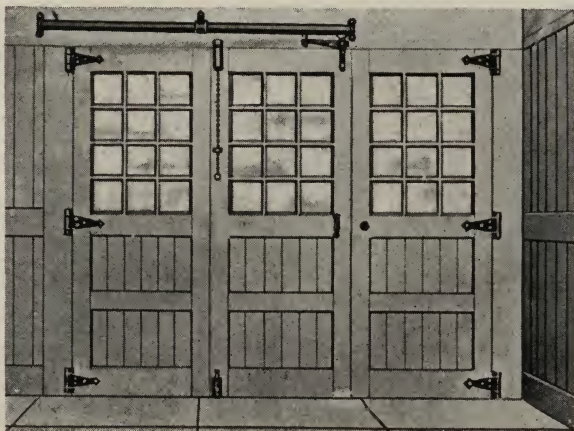


Fig. 1093

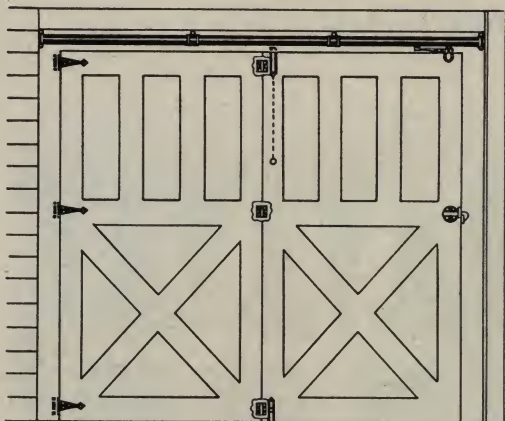
Parts May Be Purchased Separately

Although for the convenience of those who prefer it, complete sets of Cannon Ball Come-packed Fixtures are packed in a box, any of the parts may be purchased separately.

The essential thing for an installation of this character is the No. 1090 Extension Arm Hanger. All the other parts necessary to the installation will be found in the average up-to-date hardware store.



Cannon Ball Come-packed Garage Door Fixtures



No. 1152 Cannon Ball Come-packed Set

For 2 doors up to 4' wide. Opening up to 8' wide.

The set contains:

- 3 pieces Cannon Ball Track 36 inches long.
- 2 No. 682 Splice Brackets.
- 3 No. 1077 10-inch Offset T. Hinges.
- 3 No. 1078 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 1 No. 1081 Hand Pull.
- 1 No. 1090 Cannon Ball Extension Arm Hanger.
- 1 No. 1092 Hanger Stop.
- 2 No. 1097 Special End Brackets.
- 1 No. 1098 Spring Hanger Cushion.
- 1 No. 1099 Top Holder.

Complete bolts and screws for the set.

All fixtures and track packed in a box complete.

Weight per set, 50 lbs.

No. 1093 Cannon Ball Come-packed Set

For 3 doors 2'6" to 3'0" wide in openings 7'6" to 9'0" wide.

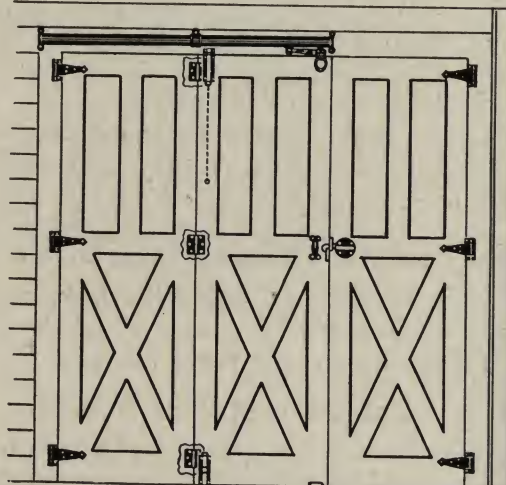
The set contains:

- 2 pieces Cannon Ball Track 40 inches long.
- 1 No. 682 Splice Bracket.
- 1 No. 789 Floor Guide.
- 6 No. 1077 10-inch Offset T. Hinges.
- 3 No. 1078 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 2 No. 1081 Hand Pulls.
- 1 No. 1090 Cannon Ball Extension Arm Hanger.
- 1 No. 1092 Hanger Stop.
- 2 No. 1097 Special End Brackets.
- 1 No. 1098 Spring Hanger Cushion.
- 1 No. 1099 Top Holder.
- 1 No. 1204 Cannon Ball Latch.

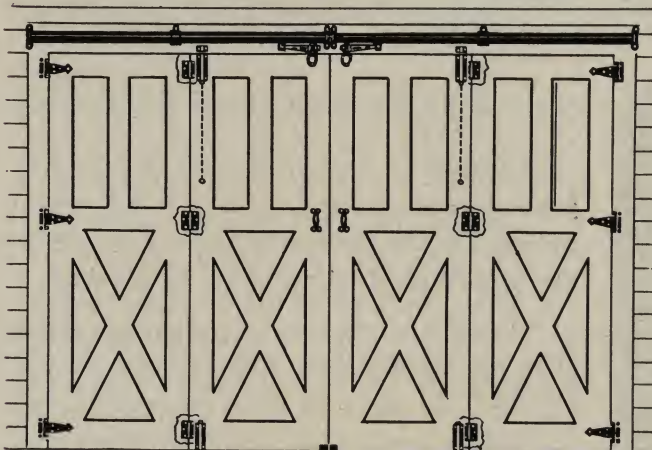
Complete bolts and screws for the set.

All fixtures and track packed in a box complete.

Weight per set 65 lbs.



No. 1094 Cannon Ball Come-packed Garage Door Set



Track Lies Flat Against Building

For four doors each 2'6" to 3'0" wide. In openings 10'0" to 12'0" wide.

- 4 pieces Cannon Ball Track 40 inches long.
- 2 No. 682 Splice Brackets.
- 1 No. 789A Floor Guide.
- 6 No. 1077 10-inch Offset T. Hinges.
- 6 No. 1078 4-inch Offset Surface Hinges.
- 2 No. 1079 Chain Bolts.
- 2 No. 1080 Foot Bolts.
- 2 No. 1081 Hand Pulls.
- 2 No. 1090 Cannon Ball Extension Arm Hangers.
- 2 No. 1092 Hanger Stops.
- 4 No. 1097 Special End Brackets.
- 2 No. 1098 Spring Cushion Hanger Stops.
- 2 No. 1099 Top Holders.

Necessary Screws, Lags and Bolts for installation.

All parts and track packed in a box complete.

Weight per set, 80 lbs.

All parts included in sets on this and the next page may be purchased separately as well as in complete sets. They are illustrated on Page 255.

Cannon Ball Come-packed Garage Door Fixtures

No. 1095 Cannon Ball Come-packed Set

Track lies flat against building.

For five doors each 2'6" to 3'0" wide. In openings 12'6" to 15'0" wide.

4 pieces Cannon Ball Track 40 inches long.

2 No. 682 Splice Brackets.

1 No. 789 Floor Guide.

6 No. 1077 10-inch Offset T Hinges.

9 No. 1078 4-inch Offset Surface Hinges.

2 No. 1079 Chain Bolts.

2 No. 1080 Foot Bolts.

2 No. 1081 Hand Pulls.

2 No. 1090 Cannon Ball Extension Arm Hangers.

2 No. 1092 Hanger Stops.

4 No. 1097 Special End Brackets.

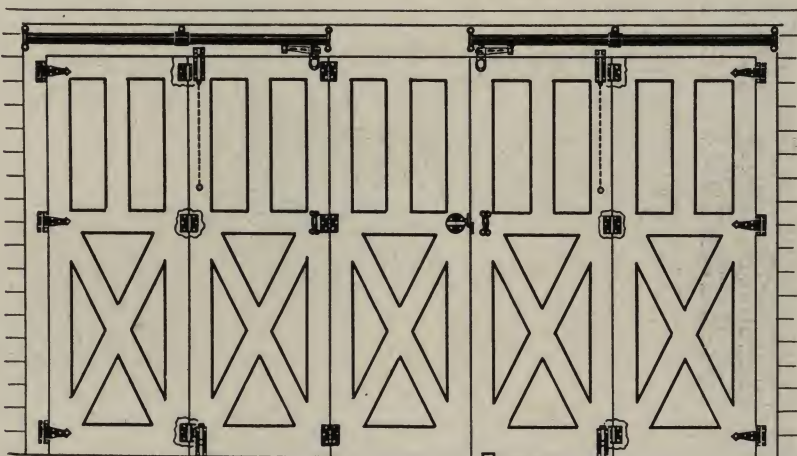
2 No. 1098 Spring Cushion Hanger Stops.

2 No. 1099 Top Holders.

1 No. 1204 Cannon Ball Latch.

Necessary Screws, Lags and Bolts for Installation.

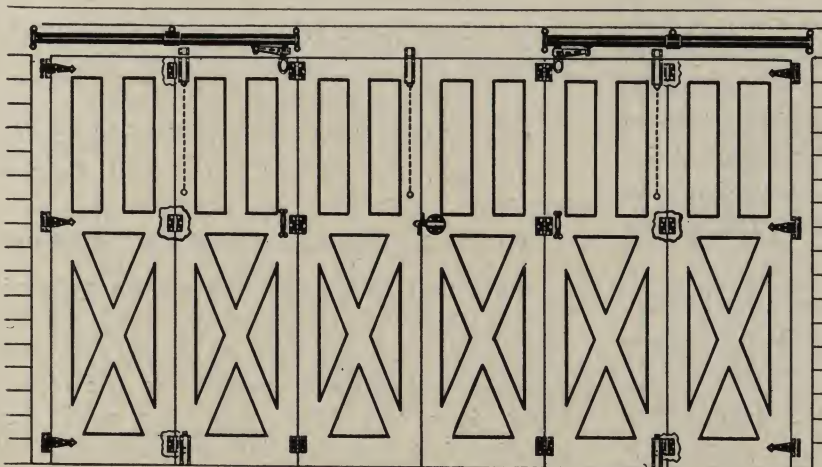
All fixtures, including track, packed in a box. Weight per set 80 lbs.



No. 1096 Cannon Ball Come-packed Set

Track lies flat against building.

For six doors each 2'6" to 3'0" wide. In openings 15'0" to 18'0" wide.



4 pieces Cannon Ball Track 40 inches long.

2 No. 682 Splice Brackets.

6 No. 1077 10-inch Offset T Hinges.

12 No. 1078 4-inch Offset Surface Hinges.

3 No. 1079 Chain Bolts.

3 No. 1080 Foot Bolts.

2 No. 1081 Hand Pulls.

2 No. 1090 Cannon Ball Extension Arm Hangers.

2 No. 1092 Hanger Stops.

4 No. 1097 Special End Brackets.

2 No. 1098 Spring Cushion Hanger Stops.

2 No. 1099 Top Holders.

1 No. 1204 Cannon Ball Latch.

Necessary Screws, Lags and Bolts for Installation.

All fixtures, including track, packed in a box. Wt. 85 lbs.

Cannon Ball Right Angle Installation

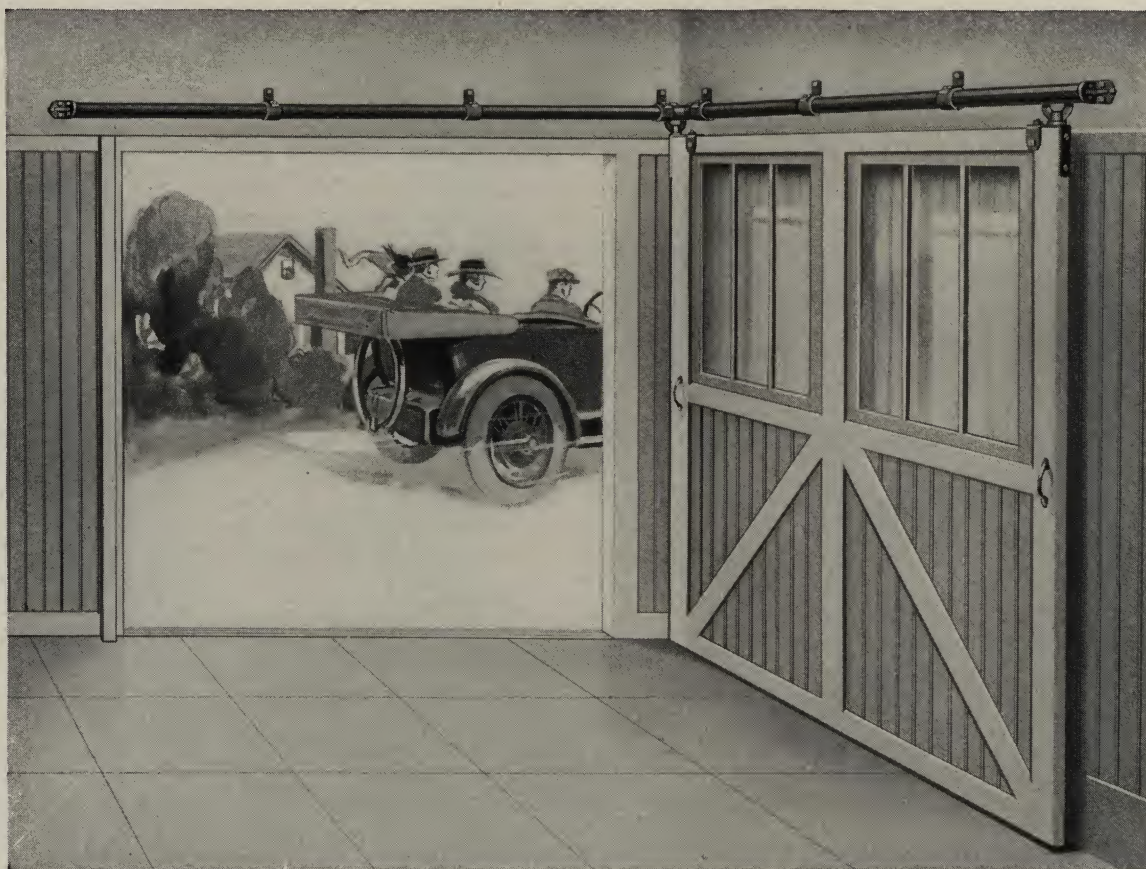


Fig 737

ONE of the general types of garages for which garage equipment must be furnished, is where the opening is placed to the extreme side of the front of the garage. The accompanying illustration shows how in such a case, the door can be installed by the use of a Cannon Ball Right Angle in connection with Cannon Ball Track and Brackets (see opposite page).

A Single Door should have two handles for easy guiding. This enables the quick opening or closing of doors.

For an installation where the Cannon Ball Right Angle is used, the following material is necessary:

FOR ONE 8-FOOT DOOR

1-12 dozen pair No. 1086 Cannon Ball Garage Hangers.

12 feet Fig. 387 Cannon Ball Track.

One only Fig. 716 Cannon Ball Right Angle.

1-3 doz. Fig. 682 Cannon Ball Center Brackets.

1-6 doz. Fig. 680 Cannon Ball End Brackets.

Note that this takes care of the type of garage where the Cannon Ball Track Curve cannot be used for lack of space. If the garage is too short to permit the use of an 8-foot door, two 4-foot doors can easily be installed, but such installations require careful fitting of the track.

No. 716 Cannon Ball Right Angle

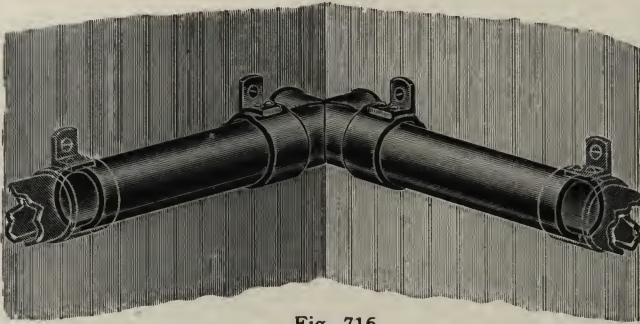


Fig. 716

The No. 716 Cannon Ball Right Angle for use with Cannon Ball Track and Brackets. Weight, each, 18 lbs. Two supporting brackets are furnished as shown in the illustration.

THE Cannon Ball Right Angle consists of two 3-foot lengths of track, cut out, intercrossed and gas-welded, forming a right angle. Each arm of the right angle is 3 feet in length; is notched on the end, as is a regular piece of Cannon Ball Track, so that it can be joined to Cannon Ball Track by the use of Cannon Ball Splice Brackets.

Two runs of track are installed and joined by the Cannon Ball Right Angle. With this arrangement,

Cannon Ball Tandem Garage Hangers, No. 1086, shown below, are used.

No. 1086 Cannon Ball Garage Door Hanger

For Use With Cannon Ball Right Angle Installations

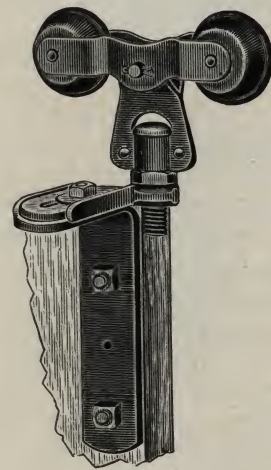
THE No. 1086 Cannon Ball Door Hanger, illustrated herewith, is designed especially for use with Cannon Ball Right Angle shown above.

It has pressed steel Cannon Ball wheels with long roller bearings. These are mounted in a heavy steel truck or frame from which the weight of the door is suspended.

This hanger is provided with adjustment which makes it possible by simply turning a screw to lower the door to make it fit the opening or raise it to clear the floor.

It also has a lateral adjustment; by turning a nut which rests on top of the strap you can set the door in or out as required.

Weight, per dozen pairs, 89 lbs.



No. 1086 Cannon Ball Tandem Adjustable Hanger for use in connection with Cannon Ball Right Angle.

Cannon Ball Curve Installation

For 1 to 4 Doors, Opening to Right or Left
(Recommended for Doors up to 3 ft. wide)

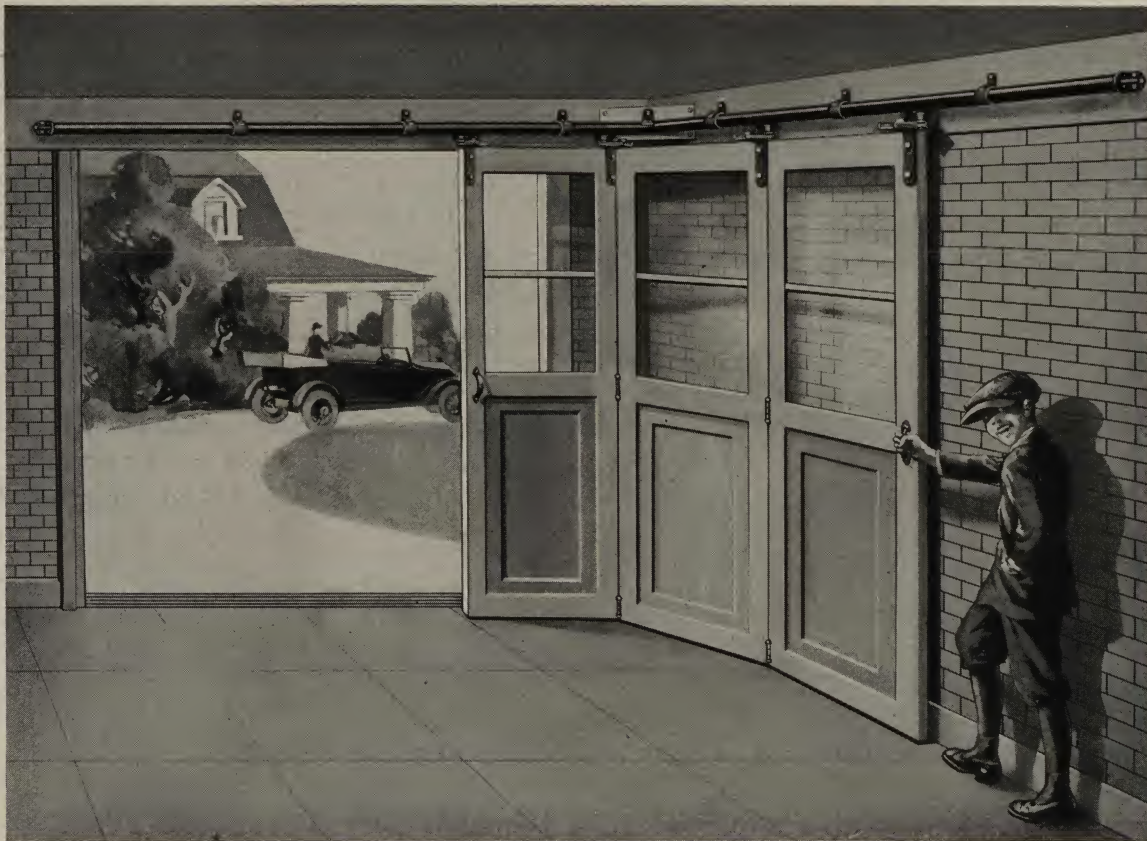


Fig. 775

WHEN hung in the manner shown in Figure 775 above, doors remain inside the building where they are not subject to damage by wind or accidents and when open they lie against the wall, occupying only the space required by their own thickness.

The Cannon Ball Curve, No. 712, used in the above installation, sets into brackets just like straight lengths of track. A special supporting bracket on the top of the curve and fastened to a brace as shown, keeps the curves from twisting or sagging. The center radius of the curve is 12 inches. Distance from corner to middle of track bracket which joins curve and straight track is $14\frac{1}{2}$ inches. By leaving off the last hanger the third door can be swung under the curve and the entire front of the building made into an opening.

No. 1140 CANNON BALL GARAGE DOOR SET
For Three Doors Around the Corner. Opening Up to 9 ft. Wide

- | | |
|---------------------------------|-------------------------|
| 2 Pr. No. 1027 Hangers | 2 No. 680 End Brackets. |
| 6 Pcs. 3 ft. Cannon Ball Track. | 6 4x4 Loose Pin Butts. |
| 1 No. 712 Curve. | 2 No. 1081 Door Pulls. |
| 1 Casing Guide. | 1 No. 789 Floor Guide. |
| 6 No. 682 Splice Brackets. | 1 6-in. Hinge Hasp. |
| | 1 Flush Door Pull. |

Complete set in box. Weight, $77\frac{1}{2}$ lbs.

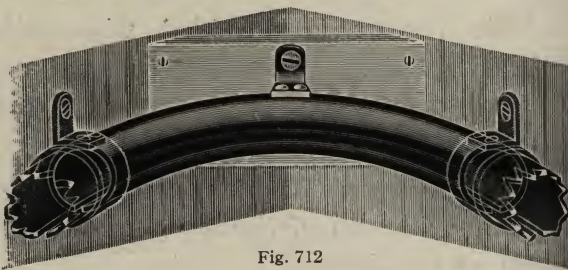


Fig. 712

The No. 712 Cannon Ball Track Curve for use with Cannon Ball Track. Weight, each, 5 lbs.

Cannon Ball Curve Installation

For 1 to 4 Doors Opening Both Ways from Center

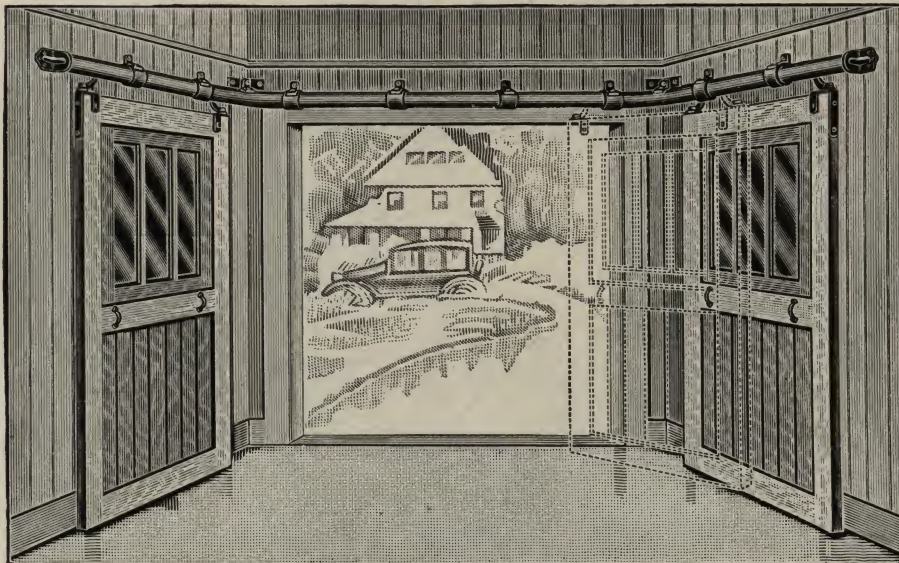


Fig. 773

Equipment necessary: 1-6 doz. pair No. 1027 Cannon Ball Garage Hangers. 21 feet Fig. 387 Cannon Ball Track. 2 only Fig. 712 Cannon Ball Curve. $\frac{3}{4}$ doz. Fig. 682 Cannon Ball Splice Brackets. 1-6 doz. Fig. 680 Cannon Ball End Brackets. 1 No. 789A Floor Guide.

With each curve a casing guide is furnished. This is fastened to the lower corner of the door casing to guide the door and prevent the casing from being marred.

Complete set of directions showing details and fixtures required for 12 different methods of closing openings of any width supplied on application.

No. 1027 Cannon Ball Garage Door Hanger

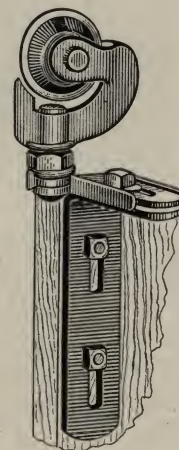
For Use with Cannon Ball Curve Installations

THE No. 1027 Cannon Ball Hanger solves the problem of providing a hanger which will successfully turn a corner in a closed or tubular track. The truck swivels freely and will not stick or bind because the guide which projects out in front of the wheel automatically keeps the wheel lined up with the slot in the track.

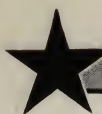
The steel ball wheel conforms to the shape of the round track and has an even bearing on both sides of the slot. The long roller bearings within the ball wheel will not pile up or bind. The No. 1027 Cannon Ball Hanger works properly and easily after years and years of wear.

By loosening a nut on top of the strap the door can be moved in or out. It can be raised if it drags on the floor or lowered to fit the opening more closely just by loosening the bolts which hold the door strap. Quickly and easily changed for right hand or left hand doors.

FIGURE 773 shows the inside arrangement of a garage where two four-foot doors meeting in the center are used to close an eight-foot door opening. Fig. 712 Cannon Ball Track Curve is used in connection with Fig. 387 Cannon Ball Track, Fig. 682 Cannon Ball Center Brackets and Fig. 680 Cannon Ball End Brackets.



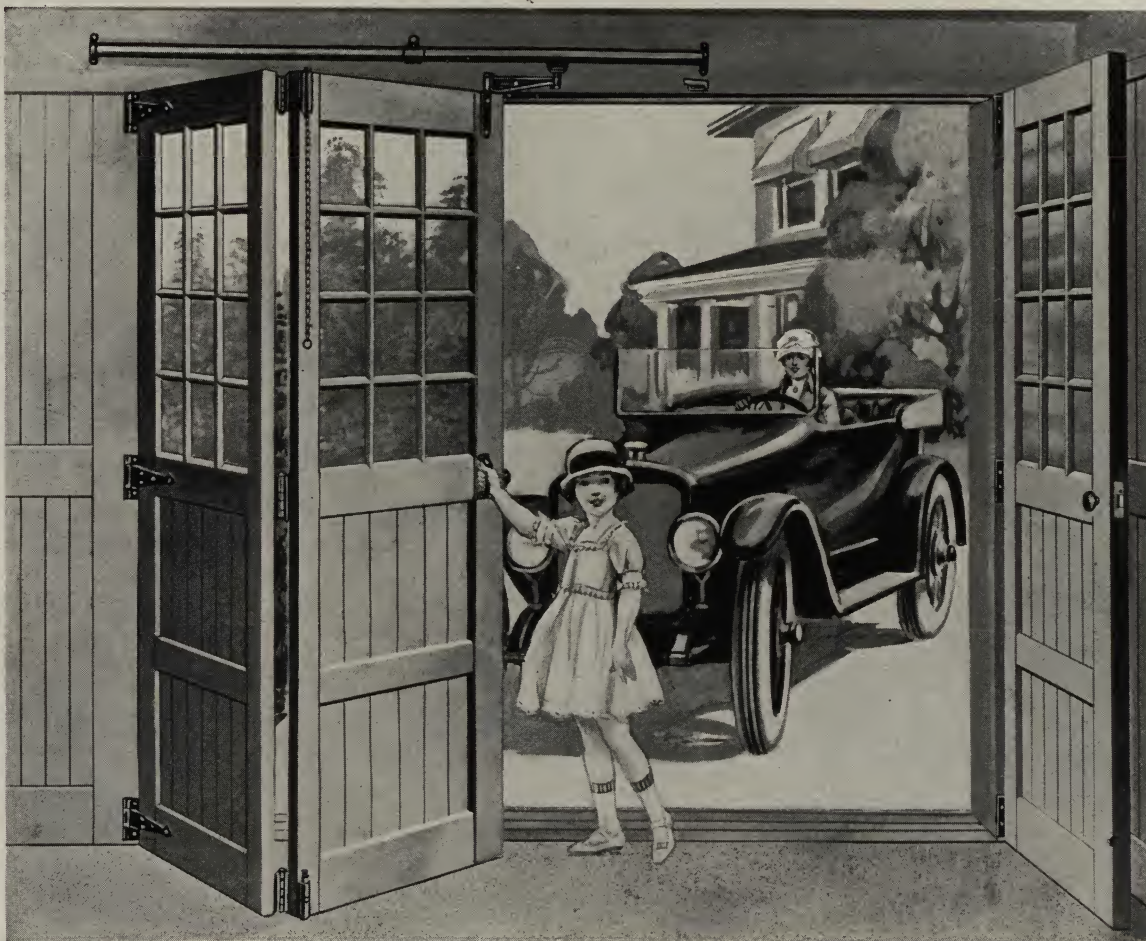
No. 1027 Cannon Ball Single Adjustable Swivel Hanger for use in connection with Cannon Ball Curve. Weight per dozen pair, 50 lbs.



No. 1103 Cannon Ball Junior Garage Door Fixtures

For Three Doors 2'6" to 3' wide in opening 7'6" to 9' wide

Track lies flat against the building. Can be used inside or outside.



CANNON Ball Junior Door Equipment illustrated above will easily handle the medium weight doors which are generally used to close a private garage. The track is made of heavy 16-gauge steel and 1½ inches in diameter. Roller-bearing ball wheels conform to the shape of the track.

The track can be installed outside if desired as the working parts of the hanger are all inside the track. The track is self-cleaning so the hanger cannot clog or stick.



No. 1103 Cannon Ball Junior Garage Door Set

Complete Fixtures for 3 Rolling, Folding Doors 2'6" to 3' wide for opening 7'6" to 9' wide.

The set contains:

- 2 38-inch pieces of track.
- 1 No. 1063 Splice Bracket.
- 1 No. 1100 Cannon Ball Junior Extension Arm Hanger.
- 2 No. 1105 Cannon Ball Junior End Brackets.
- 1 No. 1101 Cannon Ball Junior Spring Cushion.
- 1 No. 1102 Rear Bumper.
- 6 No. 1107 8-inch Offset T Hinges.
- 3 No. 1108 4-inch Offset Surface Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 1 No. 1081 Door Pull.
- 1 No. 1174 Latch.
- 1 No. 1106 Cannon Ball Junior Top Guide.

Necessary screws, bolts and lags. All fixtures, including track, packed in box complete.

Weight Per Set 45 lbs.

Any of the pieces or parts illustrated here-with may be purchased separately as well as in sets.

Illustration shows closed doors with all fixtures mounted inside. These same Cannon Ball Junior fixtures can be used outside the building as the track lies flat against the building, is weatherproof and bird-proof and completely encloses and protects the wheels of the hanger.

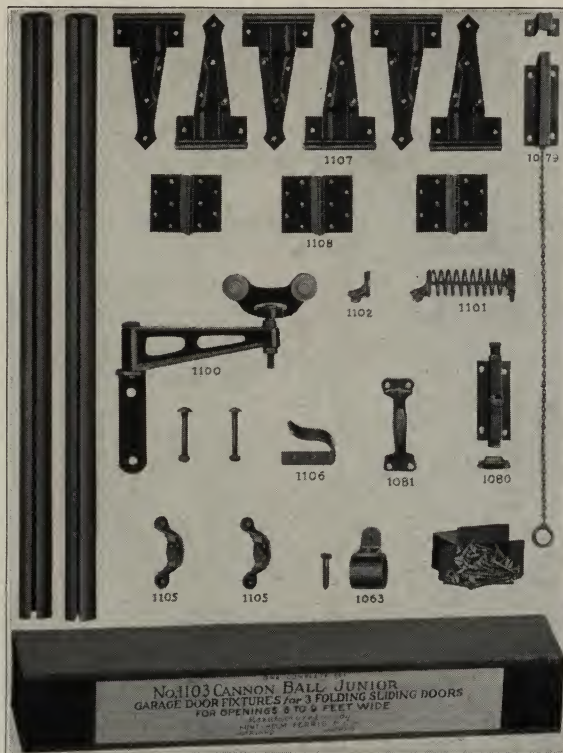


Fig. 1103.

No. 1104 Cannon Ball Junior Set

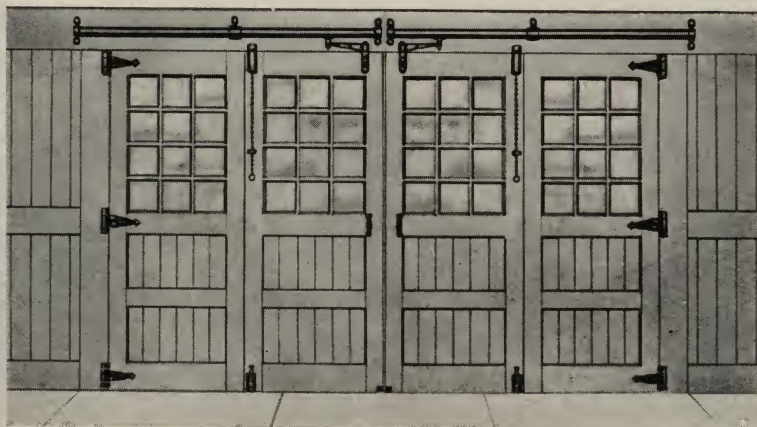
For 4 doors (2 opening to each side) 2'6" to 3' wide opening 10' to 12' wide.

- 4 38-inch pieces of track.
- 2 No. 1063 Splice Brackets.
- 4 No. 1105 End Brackets.
- 2 No. 1100 Cannon Ball Junior Extension Arm Hangers.
- 2 No. 1101 Spring Cushions.
- 2 No. 1102 Rear Bumpers.
- 6 No. 1107 8-inch Offset T Hinges.
- 6 No. 1108 4-inch Offset Surface Hinges.
- 2 No. 1079 Chain Bolts.
- 2 No. 1080 Foot Bolts.
- 2 No. 1081 Door Pulls.
- 2 No. 1106 Door Guides.

Necessary lags, bolts and screws. All parts, including track, packed in a box complete.

Weight Per Set 50 lbs.

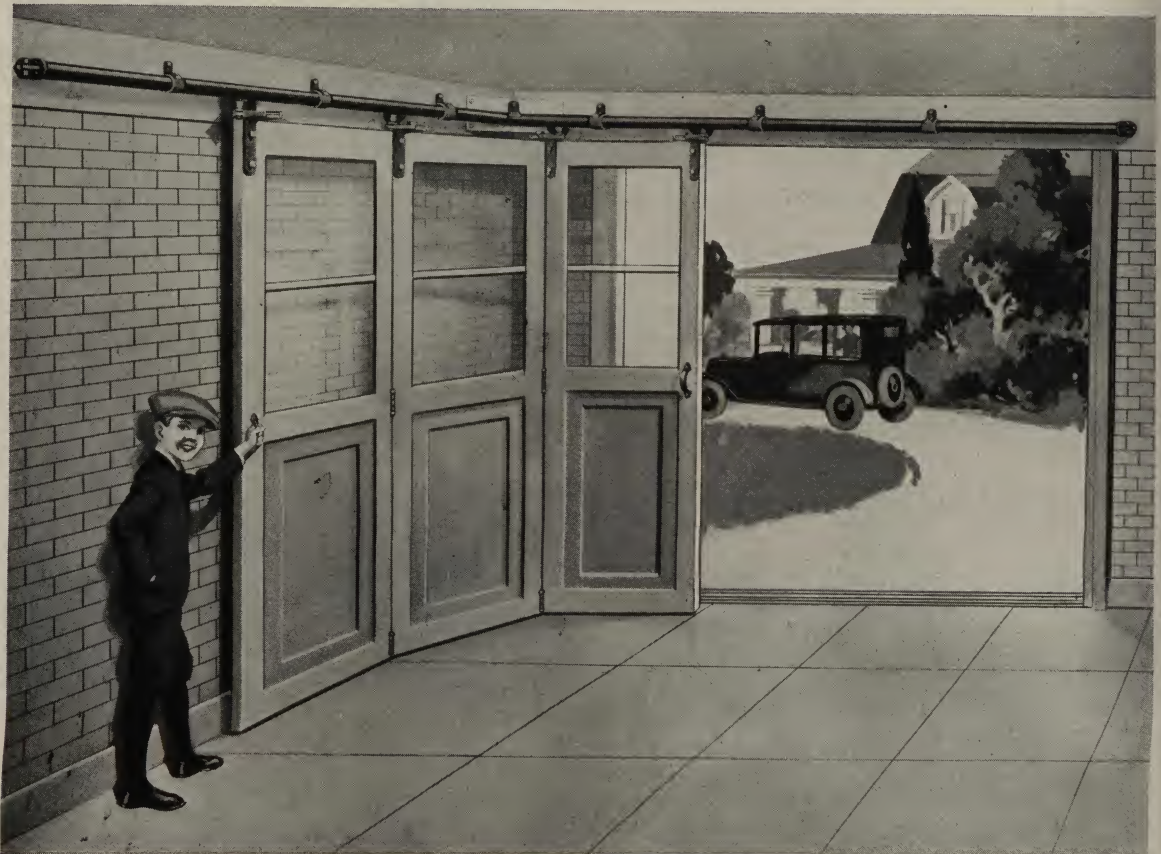
No. 1153 Cannon Ball Junior Garage Door Set. For 2 doors in 8-foot opening. Weight, 55 lbs.





Cannon Ball Junior Curve Installation

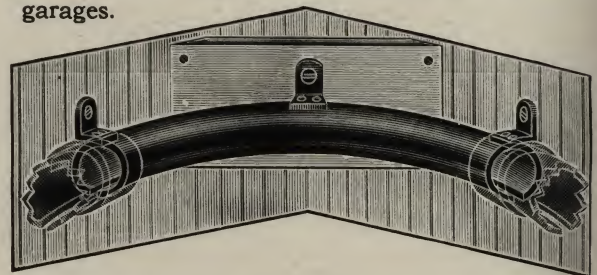
As Applied to the No. 1154 Curve



Recommended for Doors up to Three Feet Wide

THIS new Cannon Ball Junior Curve installation allows the garage doors to roll around the corner on the inside of the garage. This provides protection from damaging wind and also eliminates the possibility of doors blowing to when driving car in or out. The doors take up practically no space at all for they only occupy their own width when swung around. Any small boy or girl can operate with ease these Cannon Ball Junior Curve equipped garage doors.

This equipment will easily handle medium weight doors most generally found in private garages.



No. 1154. C. B. Junior Curve
Weight each, 3 lbs.

No. 1320 Cannon Ball Junior Garage Door Set

For Three Doors Around the Corner in Opening Up to 9 Ft. Wide

THE following equipment is required for an installation like that shown on the opposite page with doors opening to either right or left.

- 2 Pair No. 1162 Hangers.
- 6 Pieces 3' Cannon Ball Junior track.
- 1 No. 1154 Curve.
- 1 Casing Guide.
- 6 No. 1063 Cannon Ball Junior Splice Brackets.
- 2 No. 1065 Cannon Ball Junior End Brackets.
- 1 No. 1229 Flush Door Pull.
- 2 No. 1081 Door Pulls.
- 1 No. 789 Floor Guide.
- 1 6" Hinge Hasp.

6 4x4 Loose Pin Butts.

Complete in box with bolts and screws.
Shipping weight per set, 47½ lbs.

Cannon Ball Junior Curve used with regular Cannon Ball Track and No. 1162 Hanger shown below, can be used with anywhere from one to four doors sliding to the right or the left or for a like number of doors sliding both ways from the center of the opening.

Complete directions showing details and fixtures required for twelve different methods of hanging doors in openings of any width will be supplied on application.

No. 1162 Cannon Ball Junior Garage Door Hanger

For Use with Cannon Ball Junior Curve Installations

THE No. 1162 Cannon Ball Jr. Garage Door Hanger enlarges the Cannon Ball Jr. Line of Garage Hardware to a point where any installation may now be had.

From the heavy doors of large public garages to the private garage requiring only medium weight doors, there is a style of Cannon Ball Hanger to meet every need.

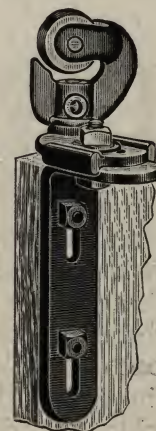
This Hanger will turn a corner in a closed or tubular track. Its truck swivels freely. The projecting guide in front of the wheel will always keep the wheel in the track slot. Notice the steel ball wheel: Shaped like the round track. While it would run smooth for an unlimited number of years, nevertheless the

long roller bearing inside the ball wheel, which will not pile up or bind, insure lasting satisfaction to Cannon Ball Jr. users.

Slots in the door straps are provided to raise or lower the doors, as conditions require.

This Cannon Ball Jr. Single Adjustable Hanger is for use with the Cannon Ball Jr. Curve.

Weight per dozen, 45 lbs.



No. 1162

No. 900 Flexo Folding-Sliding Garage Door Set

For Three Doors 2'6" to 3' wide in opening 7'6" to 9' wide

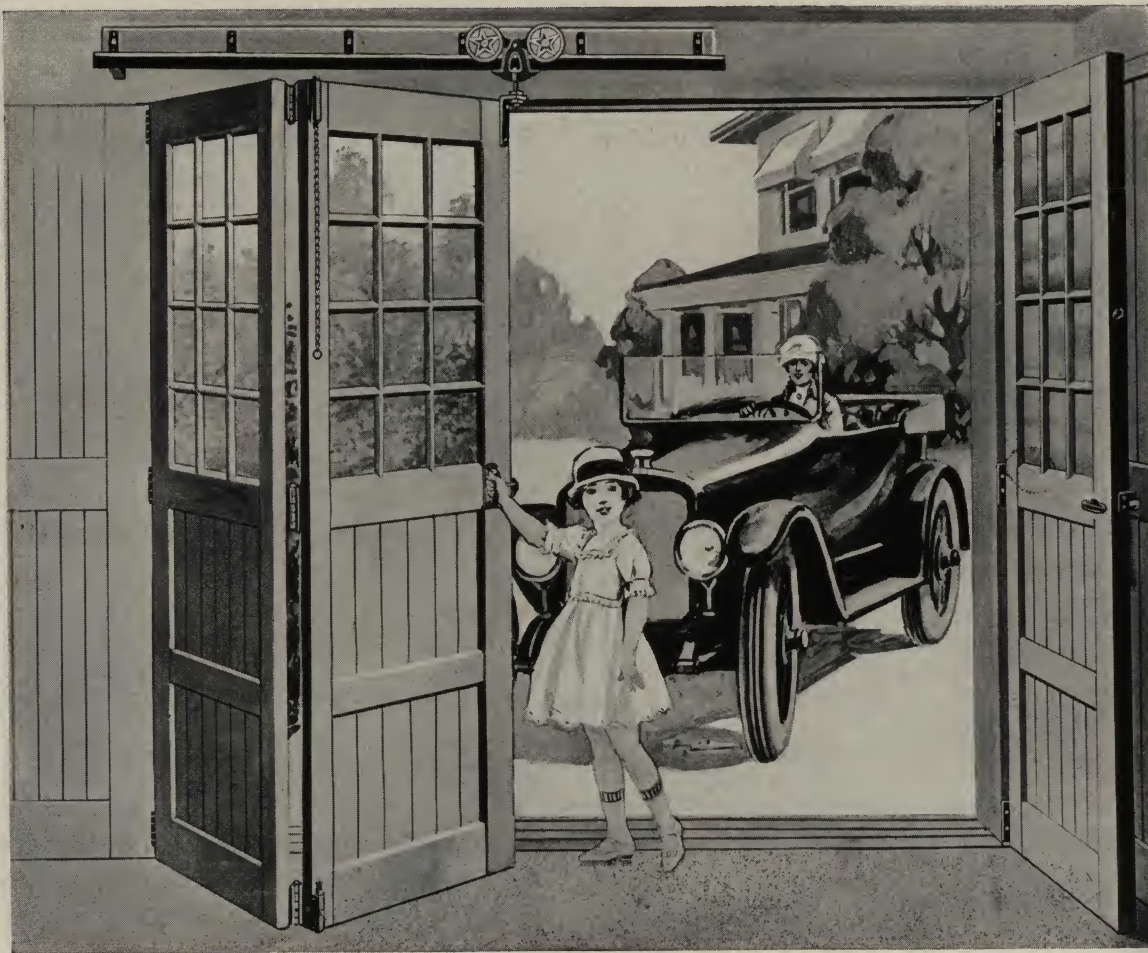


Fig. 985

THE above illustration pictures the practicability of the No. 900 Flexo Folding-Sliding Garage Door Set. Note that the service door swings back against the wall at the right, also that the two folding-sliding doors on the left roll back on our special Garage Hanger. These doors fold back against the wall where they lie flat, occupying only the space required by their own thickness. The end of the track being blocked out, holds the door securely back against the wall.

The distinctive features of the No. 900 Flexo Folding-Sliding Garage Door Set which will appeal to you, are:

1. Fits any opening.
2. Easy to install.
3. Adjustable Hanger to take care of sagging.
4. A weather-proof entrance.
5. Doors fold inside, occupying minimum space.
6. Neat in appearance and efficient in service.

No. 900 Flexo Folding-Sliding Garage Door Set

(Continued)

THE No. 900 Flexo Folding-Sliding Garage Door Set includes complete fixtures for three doors in an opening up to 9 ft. wide.

The illustration on this page shows all the fixtures.

The set includes the following:

- 1 No. 1156 Flexo, Adjustable, Roller Bearing, Tandem, Swivel Hanger.
- 1 6½ ft. Section of Flexo Track.
- 9 No. 1157 4-inch loose pin Butt Hinges.
- 1 No. 1079 Chain Bolt.
- 1 No. 1080 Foot Bolt.
- 1 No. 1081 Door Pull.
- 1 No. 1174 Cannon Ball Thumb Latch.

The necessary screws and bolts for the installation are included and all the fixtures with the exception of the track are packed in a box complete.

Weight of the complete set, including track, is 30 lbs.

This set of fixtures may be installed outside the garage as well as inside so that the doors may swing outward. It is easily and quickly installed in accordance with the clear, complete and explicit directions that are packed with each box of fixtures.

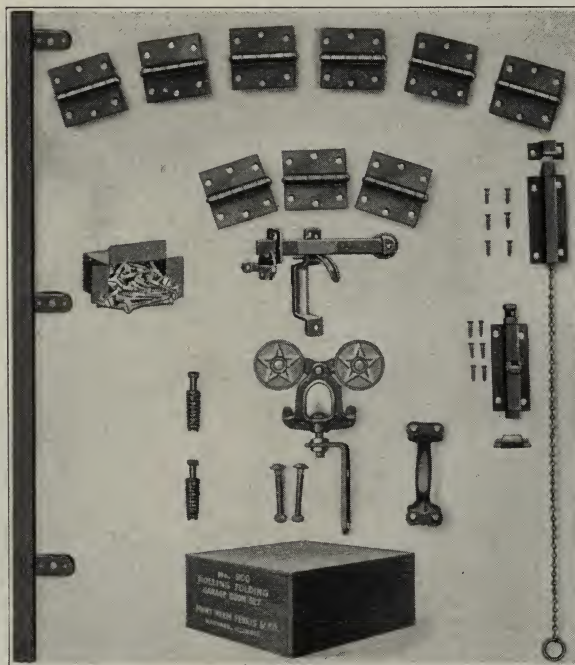


Fig. 900

This set of fixtures provides an exceedingly efficient, economical method of closing single car openings up to 9 ft. wide.

Spring bolt and foot bolt located at top and bottom at the center of the folding-sliding doors lock them securely and keep the entrance weather-tight. The roller bearing, tandem hanger insures easy and steady operation of the folding doors and the adjustable feature of the hanger makes it possible to take up any sag so the doors will not stick and bind or drag on the floor.

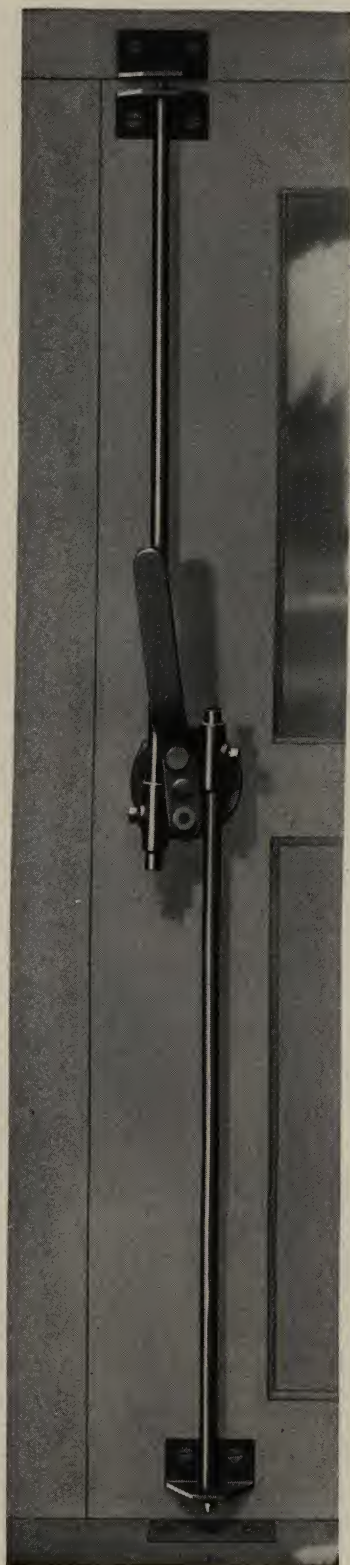


Fig. 1125

Cannon Ball Door Bolts No. 1125 Cremone Bolt

Locks top and bottom of door at same operation. It is easily adjusted to the height of the door by loosening a setscrew in the swivel bracket which fastens the bolt to the lever or handle. The illustration shows it held unlocked by the weight of the handle. It is held in locked position by moving the handle over the center to the right. The handle drops down of its own weight and the bolts are automatically locked. Bolts of $\frac{1}{2}$ in. solid steel. Malleable iron fittings. Heavy steel handle and plates. Finished black japan. For doors 7 ft. to $8\frac{1}{2}$ ft. high. Weight, each 15 lbs.



Fig. 1123 Used at
Bottom of Door



Fig. 1123

No. 1123 Cane Bolt

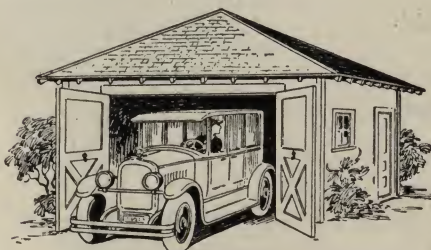
$\frac{1}{2}$ in. round rod 24 in. long. This locks and holds the door securely at top or bottom. A pin inserted above the bracket prevents bolt from dropping out of bracket when the top bolt is unlocked. Bolt, brackets and ceiling plate finished in black japan. Weight, complete, 3 lbs.

No. 1305 Cannon Ball Door Holder*

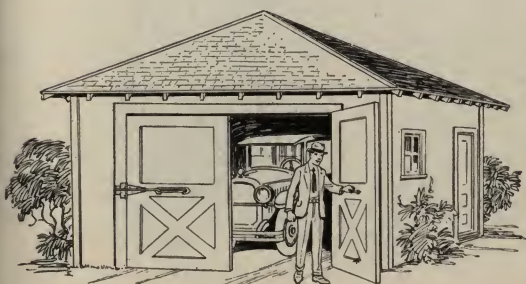


All Kinds of Doors Now Stay Where You Put Them

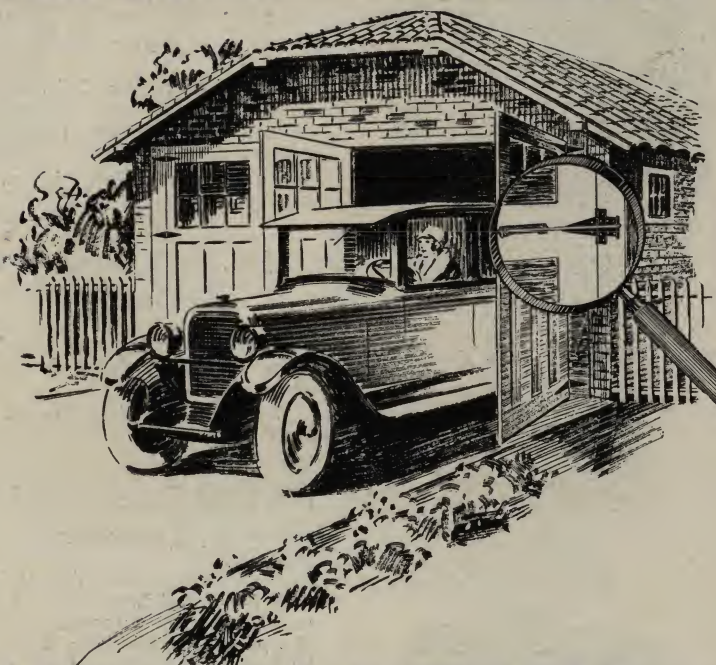
HERE is the door holder which will hold your door open against the strongest winds. The doors open to the desired angle and absolutely stay where you put them until the holder rod is raised into the sliding race shown in the illustration above.



Notice this man backing in his garage. No fear of doors slamming against car. With Cannon Ball Door Holder, the doors are securely held. When car is in the holder rod is released as shown in illustration below.



*Patent Applied For



A Positive Holder Against Wind and Storm

Your troubles of having garage doors blow shut when leaving or entering, or against the car when half way out, are now over. This Cannon Ball Door Holder is guaranteed to prevent any such happenings. It will fasten on either right or left hand doors.

Practical—Easy to Install—Simple to Operate—Durable and Low Priced

This Cannon Ball Door Holder will work with either plain or offset Hinges. This is the holder you will want for your garage. A pair can be installed on any set of doors in twenty-five minutes. Just swing doors out; the holder rod automatically drops in place and stays there until raised. Weight per set, 9 lbs. Packed one set to a carton. Close the doors from inside by turning the little trigger, as illustrated in the lower left hand picture. Close from outside by simply raising rod into sliding race.

The spring shock absorber illustrated in cut-a-way view at top of page prevents glass breakage or other damage when the door is thrown open suddenly.

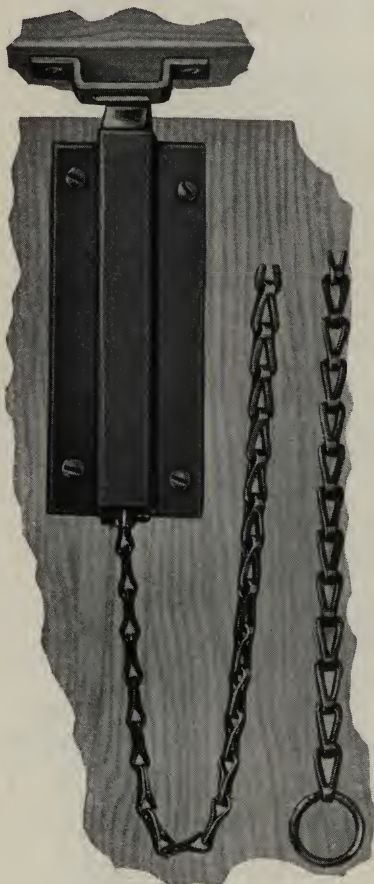


Fig. 1079

No. 1079 Cannon Ball Chain Bolt

Square bolt, $\frac{3}{4}$ "x6", operates in square casing. This prevents bolt from twisting. The bevel is always square with the strike. Spring has just the right tension for easy and positive action.

Both type of strikes shown in the accompanying illustrations are furnished with the bolt which is quickly and easily reversed into either position shown.

Finished in black japan. Weight, per doz., 9 lbs.

No. 1080 Cannon Ball Foot Bolt

A square friction bolt, $\frac{3}{4}$ "x6", sets automatically by foot pressure on top. Springs up when foot pressure releases trigger.

Finished in black japan. Weight, per doz. 9 lbs.

No. 1081 Cannon Ball Door Pull

Approved design with broad base and screw holes wide apart for swinging or sliding doors.

Finished in black japan. Weight, per doz. 5 lbs.

No. 1229 Cannon Ball Flush Door Pull

This counter sunk door pull is used with parallel sliding doors so that they pass each other without interference. It also permits inside hung, sliding doors to be opened and closed from the outside without striking the casing. Weight, per doz. 4 lbs.



Fig. 1079A



Fig. 1080



Fig. 1229

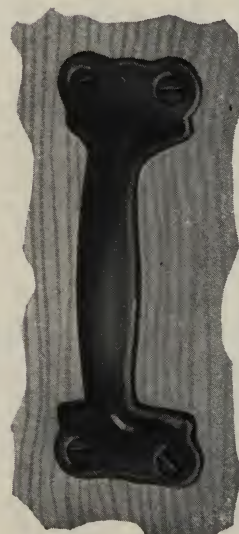


Fig. 1081

No. 173 Standard Stay Roller

Made of steel with gimlet point thread and gray iron wheel. Illustrated in Fig. 173. Japan finish. Weight, per dozen, 7 pounds.

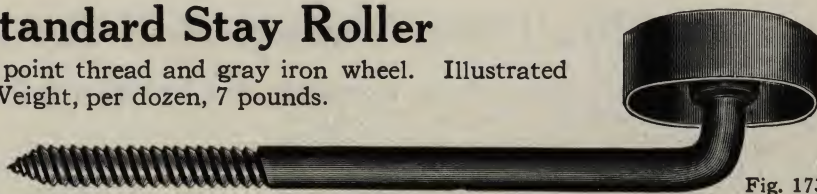


Fig. 173

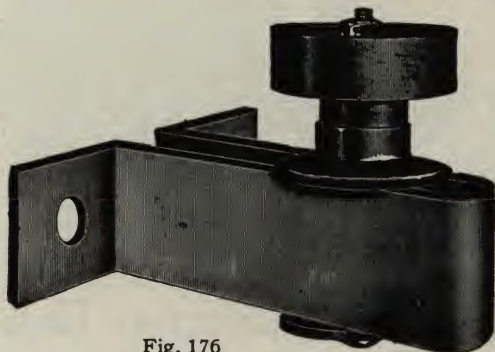


Fig. 176

No. 176 Perfection Stay Roller

The frame of Fig. 176 is made of heavy steel and the adjusting parts of iron. Cannot turn over sideways or get away from the door.

Japan finish, packed one dozen in a box.

Weight, per dozen, 12 pounds.

No. 563 Universal Stay Roller

FIGURE 563 shows the Universal Stay Roller in position where it is desired to attach it to the barn. Note extra wide space between screw holes, giving added strength and rigidity.

The Universal Stay Roller is reversible, thus allowing roller being used where it is desirable to set the legs in cement floor or driveway. This would be necessary in case of a cement or stone barn. The end of the plate to which the wheel is attached is slotted. This makes the roller adjustable to doors of different widths.

Packed $\frac{1}{2}$ dozen in pasteboard box. Japan finish. Weight, per dozen, 11 pounds.



Adjustable and
Reversible

Fig. 563

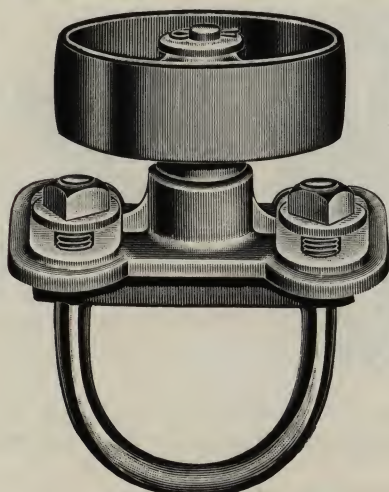


Fig. 754

No. 754 The Giant Star Stay Roller

THE Giant STAR Stay Roller was designed on account of the great demand for a large, heavy, stay roller for cement. It is made of the very best iron throughout. The wheel is $3\frac{1}{2}$ inches in diameter, having an inch and a quarter face. The complete roller is 6 inches in height. The bottom loop or template is firmly imbedded in the cement. The stay roller being separate, it can be attached by the two bolts and nuts as shown in the illustration, after the cement has hardened around the template. The roller is adjustable to doors of different thicknesses by means of the two bolts as shown in the illustration. Finished in black japan. Packed loose. Weight, each, 3 lbs.

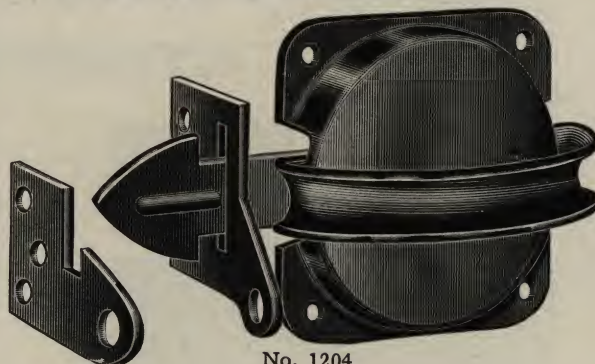
No. 1204 Cannon Ball Door Latch

IT latches automatically, being controlled by a single spring. The latch guard is so designed that it can be easily opened by a turn of the handle from without or by turning the enclosed handle grip from within. This grip or handle housing fits flush with door so as to pass door casing on sliding doors. Fits doors of any thickness up to two and one-half inches.

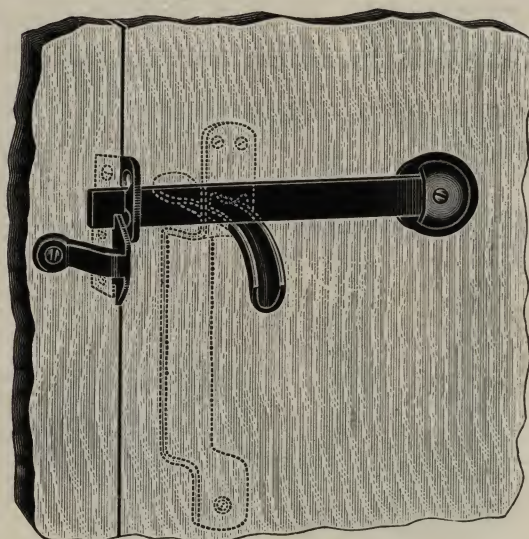
Finished in black japan, thoroughly baked on at a high temperature.

Each latch packed separately in cardboard cartons. Weight, per one-half dozen, 8 lbs.

For Swinging or Sliding Doors



No. 1204



No. 1174

No. 1174 Cannon Ball Thumb Latch

FOR all sizes of swinging doors, with a positive latching action every time.

Made from steel and japanned.

Easily and quickly installed. Simply bore hole for thumbpiece, lay latch against door in desired position and drive in screws.

Packed, one latch in a separate cardboard carton.

Weight, per dozen latches, 18 lbs.

793 Cannon Ball Door Stop

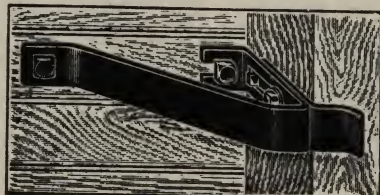


Fig. 793

THE Cannon Ball Door Stop illustrated in Fig. 793 is constructed of special high carbon steel. It is firmly braced, and when attached to the side of the building, offers a perfect and substantial bumper for the door. Adjustable to doors of different thicknesses. It is finished in black japan. Packed one dozen in box. Weight, per dozen, 9 lbs.

No. 177 Star Gravity Barn Door Catch

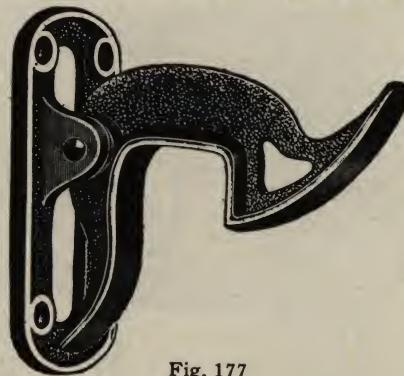


Fig. 177

Fastened to the side of the building, this device automatically catches the door and holds it open.

Packed one dozen in a box.

Weight, per dozen, 6 lbs.

No. 823 Seal-Tite Outside Door Latch

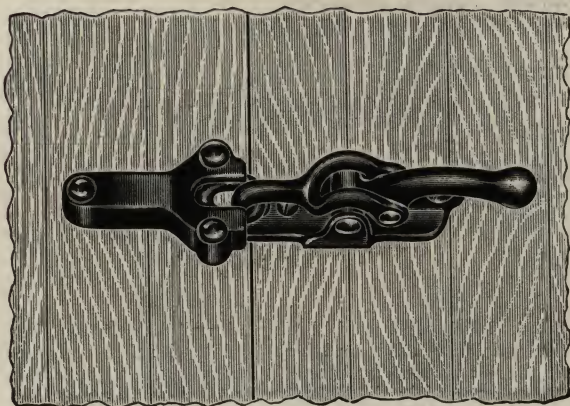


Fig. 823

blade of a knife. The strong spring attached to the loop not only draws the doors tightly together, but also automatically locks the latch so that it cannot be opened by accident.

The latch handle can be locked shut with a padlock.

This latch is especially valuable where doors have been so warped or racked that they do not meet evenly in the middle.

No. 823 Seal-Tite Door Latches are packed in paper cartons. Weight per dozen, 10 lbs.

No. 860 Seal-Tite Inside Door Latch

THE lower illustration on this page shows a latch used to draw the door up tight against the casing. This makes a stormproof connection between the door and the building. It is particularly desirable in the case of doors which have been hung for some time and do not accurately fit the opening. The construction of this latch differs but slightly from that of the latch shown above in Fig. 823; it operates in exactly the same manner. It can be locked with a padlock.

Fig. 860 Seal-Tite Inside Door Latches are packed in paper cartons. Weight per dozen, 10 lbs.

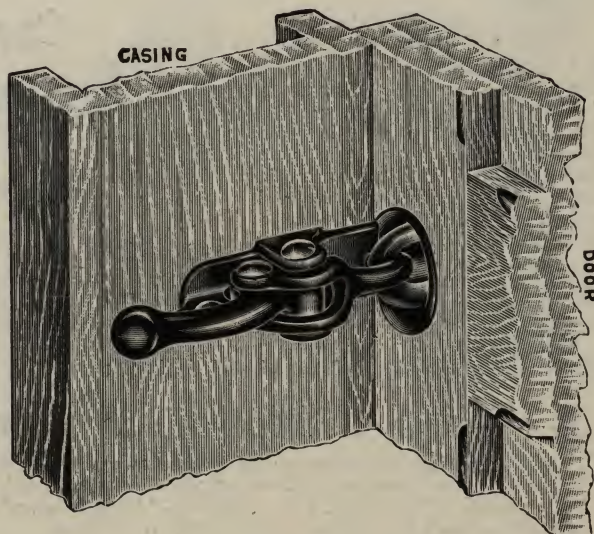


Fig. 860

No. 498 Giant Star Tackle Block Wire Stretcher Roller Bearing



Fig. 498

THE largest and most powerful Wire Stretcher made. Quick, absolutely sure. Never slips, for the heavier the pull, the better the lock holds. A one-pound pull on the rope is equal to four pounds and unlocked by a simple right or left movement of the

hand. Made with steel blocks and malleable straps. Removable steel axles and hardened steel roller bearings. Equipped with the best wire clamps ever put on a stretcher. Manufactured in three sizes, as shown on this page.

Giant STAR Roller Bearing Tackle Block Wire Stretcher, finished in gray enamel, 3-inch sheaves, strung and wrapped with 23 feet of $\frac{1}{2}$ -inch rope, weight, per dozen, packed for shipment, 120 lbs.

No. 714 Giant Star "Jr." Tackle Block Wire Stretcher

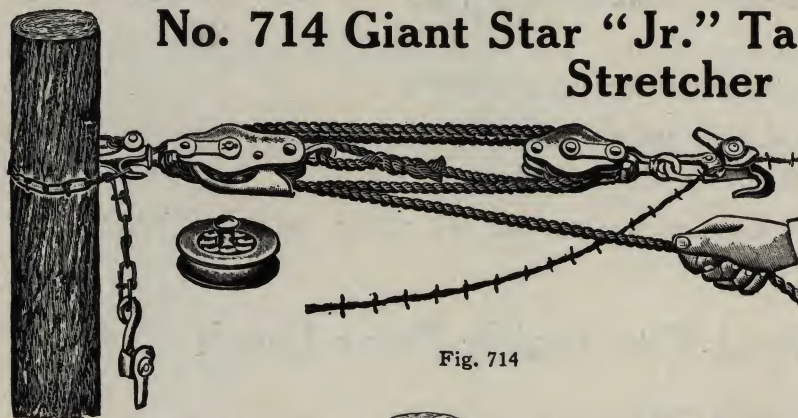


Fig. 714

A VERY popular number, identical in construction with No. 498, shown above, only with $2\frac{1}{2}$ -inch diameter sheaves. Strong, positive and efficient. Giant STAR "Junior" Roller Bearing Tackle Block Wire Stretcher finished in gray enamel, strung and wrapped with 20 feet of $\frac{1}{2}$ -inch rope, $2\frac{1}{2}$ -inch sheaves. Weight, per dozen, packed ready for shipment, 100 lbs.

Made plain bearing only.

Specify 714G if wanted with No. 5 wire grip shown below.

No. 482 Star

SAME as two numbers above, only made with smaller blocks and 2-inch sheaves, and so designed that the pull is away from the wire toward the post. STAR Correct Tackle Block Wire Stretcher, finished in gray enamel, strung and wrapped with 16 feet of $\frac{3}{8}$ -inch manila rope.

Weight, per dozen, packed ready for shipment, 66 lbs. Made only roller bearing, finished in gray enamel.

Specify 482G if wanted with No. 5 wire grip shown below and with $\frac{1}{16}$ -inch rope.

Correct Wire Stretcher

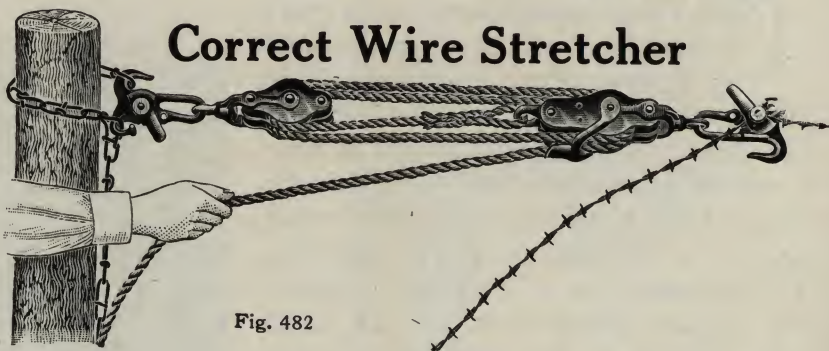


Fig. 482

No. 5 Come-Along Wire Grip

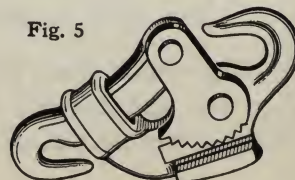
THIS is the type of wire grip used on smooth wire by linemen of public utility companies. The eccentric tightens on the wire as the pull increases.

Furnished with No. 714 when No. 714G is specified.

Furnished with No. 482 when No. 482G is specified.

Can also be used with any other Star Tackle Block Wire Stretcher or purchased separately to use with any wire stretcher.

Fig. 5



No. 400 Star Steel Tackle Block Wire Stretcher

Plain Bearing

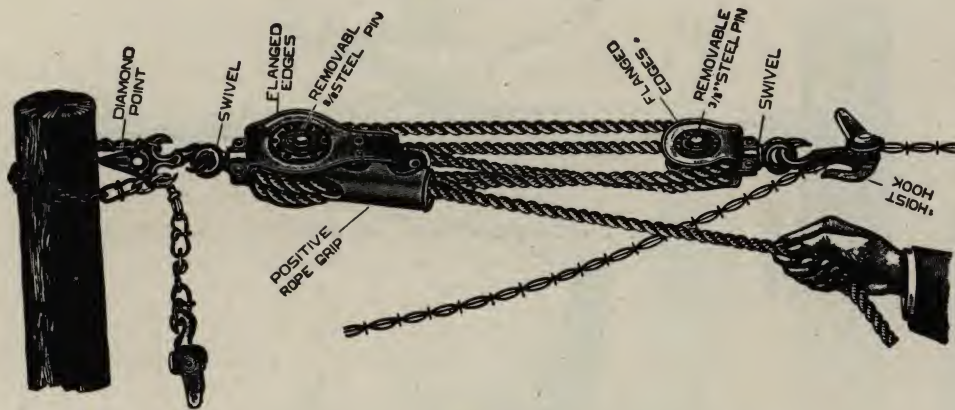


Fig. 400

THE STAR Steel Tackle Block Stretcher is self-supporting at the post. Each block is constructed with a swiveling hook and the side plates have flanged edges which prevent wear on the rope.

Each block has a removable pin held in place by a cotter, so that a sheave can be replaced when necessary.

The eccentric clamp used on the rear block is constructed with a hook so that the stretcher can be used for a hoist if desired.

Strung with 16 feet of 3-8 inch rope, ready for use.

Made only plain bearing finished in red enamel.

Weight, per dozen, 50 pounds.

No. 200 Sampson Woven Wire Stretcher

THIS stretcher answers perfectly the demand for a first class woven wire stretcher of sufficient strength to sustain any pull with enough power to stretch any length of fence desired. The Sampson fits the case exactly for it is strong enough to stand any strain necessary to make the fence snug and tight.

It is made very simple in operation and construction and works perfectly. Every movement of the powerful handle stretches the wire several inches. The grip engages the chain firmly and is easily moved when slackened. Handle is 5 feet long, clamping bars 4 feet 6 inches long, both of hardwood. Eight feet of $\frac{3}{8}$ -inch tested chain with each stretcher.

The Sampson is furnished with handle without extra charge. Weight each, 35 lbs.

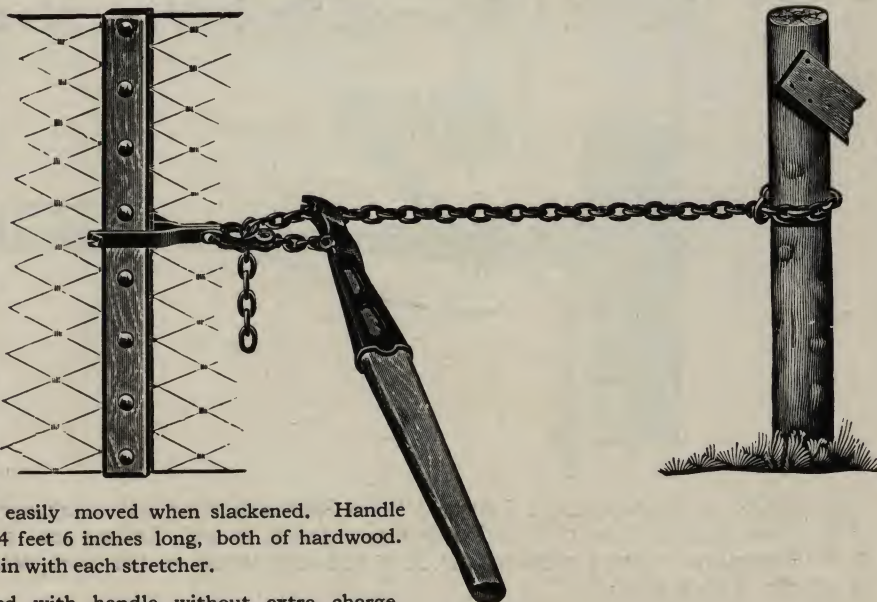


Fig. 200



No. 190 Ellwood Pattern Wire Stretcher

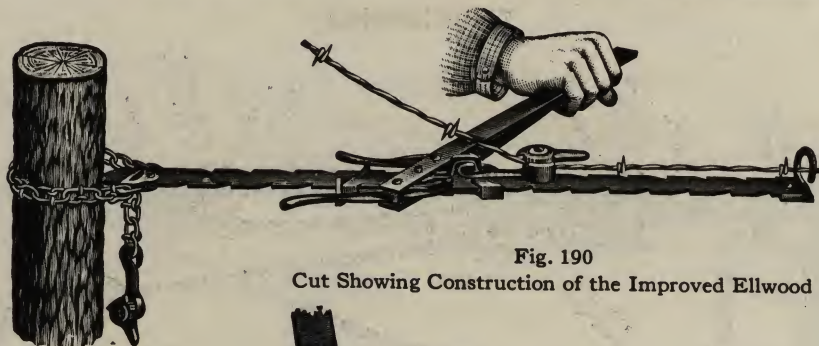


Fig. 190
Cut Showing Construction of the Improved Ellwood

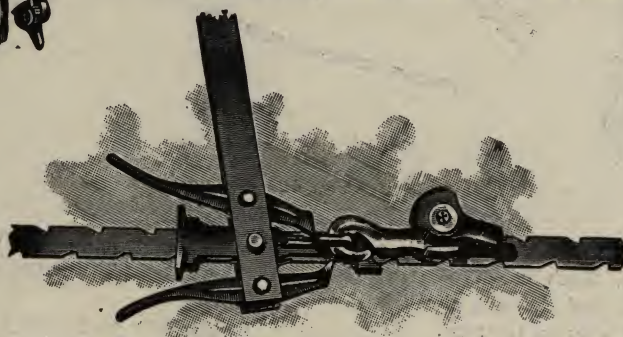


Fig. 191 1/2

THE Ellwood Wire Stretcher has been on the market for the past twenty years and is known as the best flat bar wire stretcher made. Note that our stretcher is self-supporting at the post. Packed three dozen in a case. The weight per dozen, packed for shipment, is 56 lbs.

No. 191 Ellwood Rod Wire Stretcher

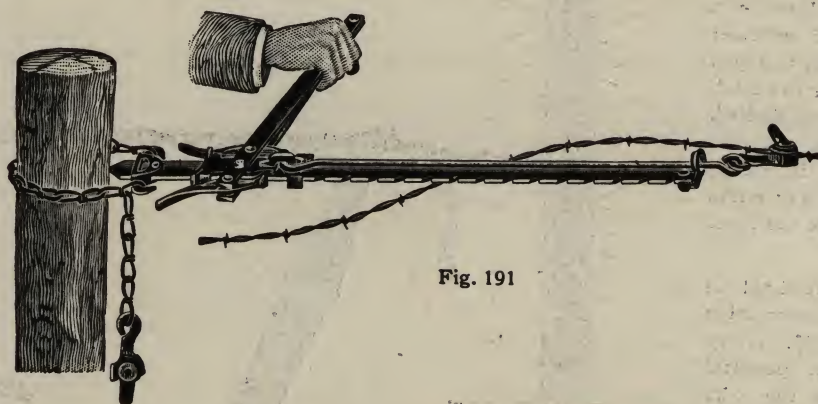


Fig. 191

ABOVE we illustrate the Ellwood Wire Stretcher with rod extension. This Stretcher having been furnished to the trade for many years, is well known and no extended description is necessary. Note, please, that it is self-supporting at the post, which is a patented feature of all our wire stretchers.

Packed three dozen in a case. The weight per dozen, packed for shipment, is 65 lbs.

Giant Star Roller Bearing Steel Hoists

(Self-locking)

A Few Important Features

1. Steel blocks throughout, double and triple sheave both upper and lower.

2. A heavy reinforced, drop forged yoke on each block is attached to the axle pin. The hooks are attached to this yoke by a special double pressed and riveted swivel which slides on the yoke, making the block very flexible.

3. The hooks are extra heavy, reinforced, drop forged and very strong.

4. The sheaves revolve on hardened steel axles, fitted with cold rolled steel bearings, reducing the friction to a minimum.

5. The axles are held in place and can be instantly removed and replaced at any time if desired. These are keyed axles—an important point. They will not turn when heavily loaded, thus avoiding cutting the sides of the hoist.

6. The lock which is the vital feature of the hoist is made of malleable iron and is attached to the axle pin, making it very quick, sure, safe and easy in operation. This lock is on the draft rope. You do not have to use any special locking rope on the Giant STAR. When you stop pulling and move the draft rope slightly outward away from the block or if pulling in that direction, the hoist instantly locks. The heavier the load, the more securely it holds and locks. The lock is released instantly by a slight pull or a little snap of the rope towards the block. The Giant STAR Hoist elevates, lowers, locks and unlocks with one rope only.

7. These hoists are furnished in battleship gray enamel finish. All hoists furnished without rope.



Fig. 505

Made in the following sizes:

No.	Sheaves Above	Sheaves Below	Size of Rope	Diameter	Approx. Capacity	Weight, Lbs. Each
2	2	2	$\frac{3}{8}$ in.	2 in.	1,000 lbs.	4
21	1	1	$\frac{3}{8}$ - $\frac{1}{2}$ in.	$2\frac{1}{2}$ in.	2,000 lbs.	5
22	2	2	$\frac{3}{8}$ in.	$2\frac{1}{2}$ in.	2,000 lbs.	6
23	3	3	$\frac{3}{8}$ - $\frac{1}{2}$ in.	$2\frac{1}{2}$ in.	2,000 lbs.	8
31	1	1	$\frac{1}{2}$ - $\frac{5}{8}$ in.	3 in.	4,000 lbs.	6
32	2	2	$\frac{1}{2}$ - $\frac{5}{8}$ in.	3 in.	4,000 lbs.	8
33	3	3	$\frac{1}{2}$ - $\frac{5}{8}$ in.	3 in.	4,000 lbs.	$9\frac{1}{2}$
41	1	1	$\frac{5}{8}$ - $\frac{3}{4}$ in.	4 in.	6,000 lbs.	$10\frac{1}{2}$
42	2	2	$\frac{5}{8}$ - $\frac{3}{4}$ in.	4 in.	6,000 lbs.	$14\frac{1}{2}$
43	3	3	$\frac{5}{8}$ - $\frac{3}{4}$ in.	4 in.	6,000 lbs.	18

Bear in mind, please, that this is the only complete line of self-locking, roller-bearing hoists on the market.



No. 225 Star Anvil and Vice

A VERY useful and convenient tool. No mechanic or farmer can afford to be without one. Face hardened and polished. Wrought iron screw. Face 3 x 7 inches. Jaw will open 4 inches. Will hold gas pipe or round iron.

Weight each, 22 pounds.

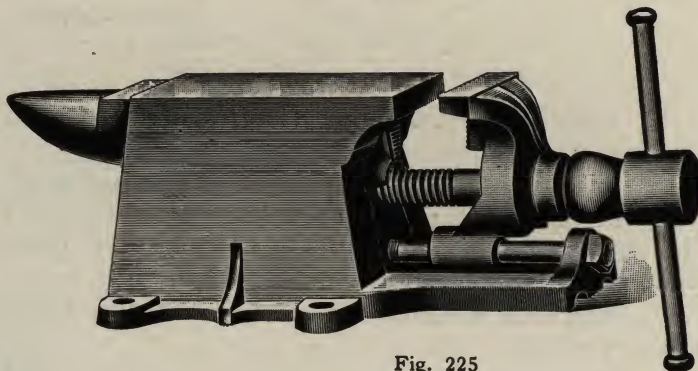


Fig. 225

No. 64 Star Boat Anchor

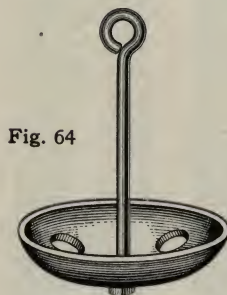


Fig. 64

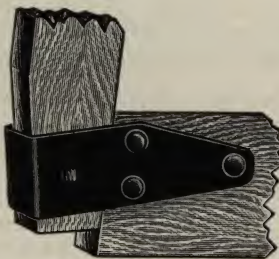
THE STAR Boat Anchor is 12 inches high. Its base is 8½ inches wide.

The STAR Anchor is the most practical type made for row-boat requirements. It attaches to the bottom easily and surely, and at the same time can be disengaged and lifted easily and quickly, the water running out through the holes in the base.

The STAR Boat Anchor will not catch on snags.

Weight each, 18 pounds.

No. 492 Star Stake Holder



THE STAR Stake Holder is made of steel 2½ inches in width, and ⅛ inch in thickness, intended to hold a 2 x 4 or 2 x 3 inch stake, tapered at the lower end. It is fastened to the ends of the cross timbers of the hay rack by means of bolts so that the side stakes will fit securely into this holder, as shown.

Weight, per dozen, 15 pounds.

No. 60 Star Manhole Ring and Cover



Fig. 60
Showing Cover Removed



Fig. 61
Showing Cover in Place

THESE manhole ring and covers are in constant demand for use in connection with cesspools, outdoor cisterns and sewer traps.

Both ring and cover are made of heavy cast iron. The cover has a bayonet type of lock which locks securely by simply turning it in the ring which makes it proof against accidents to children.

Diameter of ring, 22¾ inches.

Diameter of cover, 20½ inches.

Weight, complete, 46 lbs.

95 Good Reasons Why Star Features Are Exclusive

THE patents listed below readily explain why the most valuable and important features are confined exclusively to and are to be found only in the STAR Line. The exclusive features without number which are controlled by our patents are evidence of the thought, of the ingenuity and of the years of hard work devoted to originating the STAR Line and bringing it to its present state of perfection.

The STAR Line is fully covered and protected by patents. As required by law, we hereby warn all infringers against any attempt to copy or duplicate STAR patented features.

We also warn the public against the use of such infringements, as the users, according to law, share the liability of those who make them.

Patent No.	Date	Invention
1,078,999.....	Nov. 18, 1913.....	Stall Construction
1,068,753.....	July 29, 1913.....	Stall Construction
1,066,195.....	July 1, 1913.....	Stanchion
1,066,194.....	July 1, 1913.....	Animal Stall
1,064,466.....	June 10, 1913.....	Stop Device for Stalls
1,057,720.....	April 1, 1913.....	Stall Construction
1,056,523.....	Mar. 18, 1913.....	Feed and Litter Carriers
Design 43,458.....	Jan. 21, 1913.....	Animal Pen
Design 43,457.....	Jan. 21, 1913.....	Animal Pen
1,122,711.....	Dec. 29, 1914.....	Stanchion
1,121,176.....	Dec. 15, 1914.....	Mangers
1,118,754.....	Nov. 24, 1914.....	Stall Construction
1,101,169.....	June 23, 1914.....	Stall Construction
1,095,148.....	April 28, 1914.....	Mangers
1,086,812.....	Feb. 10, 1914.....	Stall Side Construction
1,084,934.....	Jan. 20, 1914.....	Partition for Feed Troughs
1,083,605.....	Jan. 6, 1914.....	Stanchions
1,101,170.....	June 23, 1914.....	Hay Carrier
1,104,353.....	July 21, 1914.....	Barn Door Track
1,128,769.....	Feb. 16, 1915.....	Calf Pen
1,124,718.....	Jan. 12, 1915.....	Means for supporting members of Stalls and the like
1,162,286.....	Nov. 20, 1915.....	Cattle Watering Device
1,160,589.....	Nov. 16, 1915.....	Stall Construction
1,160,588.....	Nov. 16, 1915.....	Cattle Watering Device
1,156,472.....	Oct. 12, 1915.....	Overhead Track Joint and supporting means therefor
1,151,256.....	Aug. 24, 1915.....	Means for supporting members of Stalls and the like
1,145,474.....	July 6, 1915.....	Stall Construction
1,158,911.....	Nov. 2, 1915.....	Fence Post
1,126,435.....	Jan. 26, 1915.....	Hay Carrier
166,807.....	Dec. 28, 1915.....	Fence Post
1,210,159.....	Dec. 26, 1916.....	Animal Stall
1,208,118.....	Dec. 12, 1916.....	Stall Construction
1,207,286.....	Dec. 5, 1916.....	Stall Construction
1,197,194.....	Sept. 5, 1916.....	Animal Stall
1,197,193.....	Sept. 5, 1916.....	Animal Stall
1,172,236.....	Feb. 15, 1916.....	Animal Stall
48,467.....	Jan. 18, 1916.....	Tank Heater
1,194,729.....	Aug. 15, 1916.....	Hook
1,207,285.....	Dec. 5, 1916.....	Hay Carrier



STARLINE INC.



Patent No.	Date	Invention
1,178,065	April 14, 1916	Door Hanger
1,185,189	May 30, 1916	Door Hanger
168,733	April 11, 1916	Stall Construction
1,172,236	Feb. 15, 1916	Animal Stalls
48,167	Jan. 18, 1916	A Tank Heater
1,239,170	Sept. 4, 1917	Hog Pen
1,235,453	July 31, 1917	Track for Door Hangers
1,225,320	May 8, 1917	Stall Construction
1,226,201	May 15, 1917	Bull Staff
1,251,207	Dec. 25, 1917	Door Latch
1,250,574	Dec. 18, 1917	Fastener for Door
1,241,364	Sept. 25, 1917	Gate for Stall Construction
1,288,861	Dec. 24, 1918	Door and Track
1,283,712	Nov. 5, 1918	Pig Guard
1,282,403	Oct. 22, 1918	Overhead Track
1,271,454	July 2, 1918	Overhead Track
1,256,457	Feb. 12, 1918	Stall Frame Construction
1,291,457	Jan. 14, 1919	Hay Carrier
1,312,242	Aug. 5, 1919	Pig Pens
1,314,953	Sept. 2, 1919	Stanchions
1,341,308	May 25, 1920	Solid Wheels and Tires
1,330,438	Feb. 10, 1920	Water Bowls
1,333,300	Mar. 9, 1920	Hay Wagon Construction
1,330,439	Feb. 10, 1920	Water Bowls
1,330,440	Feb. 10, 1920	Water Bowls
56,804	Dec. 28, 1920	For a Display Stand for Drinking Fountains for stock
1,330,437	Feb. 10, 1920	Water Bowls and Exhibiting Stands therefor
1,355,548	Oct. 12, 1920	Barn Door Tracks
1,347,941	July 27, 1920	Stall Construction
1,403,853	Jan. 17, 1922	Overhead Switches
1,449,899	Mar. 27, 1923	Hay Carriers
1,448,394	Mar. 13, 1923	Litter Carriers
1,445,307	Feb. 13, 1923	Animal Pens
1,441,724	Jan. 9, 1923	Animal Pens
1,459,527	June 19, 1923	Wagon Wheels
1,456,210	Aug. 28, 1923	Rubber Tired Wheels
1,464,982	Aug. 23, 1923	Track Hanger
1,492,245	April 29, 1924	Hub Caps
1,499,312	April 24, 1924	Garage Door Hangers
1,479,499	Jan. 1, 1924	Water Bowls
1,501,589	July 15, 1924	Coaster Wagons
1,481,002	Jan. 15, 1924	Truck for Feed Track
1,492,244	April 29, 1924	Reversible Steering Gears
1,516,179	Nov. 18, 1924	Fenceposts
1,524,513	Jan. 27, 1925	Coaster Wagon
1,541,490	June 9, 1925	Pedal Car
1,578,415	Mar. 30, 1926	Skeeboggan
1,599,703	Sept. 14, 1926	Stanchion Lock
1,608,143	Nov. 23, 1926	Friction Clutch
1,612,501	Dec. 28, 1926	Water Bowl
1,624,485	April 12, 1927	Rust Shield
1,636,468	July 19, 1927	Door Holder
1,670,765	May 22, 1928	Hay Carrier
76,611	Oct. 16, 1928	Airplane Swing
1,726,290	Aug. 27, 1929	Door Track
1,735,536	Nov. 12, 1929	Water Bowl

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